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ABSTRACT

This book is the fourth monograph in the Cornell International Monograph Series, the second in the series to deal with the question of breast versus bottle feeding. The introduction to the monograph discusses the shift from breast to bottle feeding in both industrialized and developing nations. Some of the reasons for, and consequences of, the decline in breast feeding are presented. Economic, nutritional and hygienic concerns in regard to the use of commercial infant foods, especially in developing countries, are discussed. The remainder of the monograph presents strategies for solving the bottle feeding problem in developing nations. The problem of commercial infant food promotion directed towards health professionals as well as towards the general public is discussed at length. The monograph reviews previous efforts to curtail this type of advertising and suggests new approaches to solving the promotion problem. The use of interpersonal, face to face, communication is recommended for the diffusion of new ideas in an infant feeding campaign. Three appendices to the monograph describe the economic and hygienic problems encountered with bottle feeding in St. Vincent, West Indies. A final appendix lists resources useful in supporting efforts to reverse current infant feeding trends. (ED)

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REGULATION AND EDUCATION: STRATEGIES FOR SOLVING THE BOTTLE FEEDING PROBLEM

by Ted Greiner

with an introduction by Michael C. Latham

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INTRODUCTION

by
Michael C. Latham, M.D., M.P.H.
Professor of International Nutrition, Cornell University

This monograph is the second in the series which is written by Mr. Ted Greiner and which deals with the question of breast and bottle feeding. Since the previous monograph entitled "The Promotion of Bottle Feeding by Multinational Corporations: How Advertising and the Health Professions Have Contributed" was issued in 1975, there has been an accelerated interest in the question of breast and bottle feeding of infants. This new concern by the general public on the one hand, and by nutritionists and physicians on the other, has been generated by several events. The court case which Nestle's took against the Third World Action Group in Switzerland undoubtedly was a major reason why the mass media focused attention on this issue.

It is unfortunate that the surge in public interest in the problem has not been matched by any great increase in published studies on the issue, nor by good analyses of the problem. Undoubtedly now there is a need for research, most of it applied, and also for action to prevent the further spread of inappropriate bottle feeding, especially in poor countries. Breast milk is a very important food and is consumed by many millions of infants. Yet there is so little information or research on it as a food, on what influences its production, and on local breast feeding practices.

Human Milk Yields Declining

World yields of most cereal grains, and that of many other major food crops, have apparently been gratifyingly high in 1976. However, this was a disastrously bad year in the world as far as human breast milk production is concerned. I estimate that total world production of human breast milk may be 12 billion liters short of production potential. This "loss" in monetary terms is in the order of 6 billion dollars. Where total grain production has steadily increased over the last 4 decades, total production of breast milk has declined quite dramatically.

There are probably over 120 million infants alive in the world. If all their mothers were in full lactation providing appropriate quantities of milk for them, they would in one year produce over 30 billion liters of milk. This would provide 22,500 billion kilocalories and 400 billion grams of protein. The value of this milk at U.S. supermarket prices for whole fluid milk would be about 15 billion dollars, and yet the cows' milk would provide less energy than the human milk.

In the last 20 years a network of some ten excellent international research centers have been established around the world with the objective of conducting research designed to improve food production, and to increase yields of specific food crops. IRRI in the Philippines and CIMMYT in

Mexico are perhaps the best known. These ten centers together are working on rice, maize, wheat, millet, sorghum, legumes, potatoes, vegetables and animal production. The total budget of these centers in 1975 was about 50 million dollars (1). Where is there a comparable institute conducting research to help ensure an adequate supply of breast milk? There is no such institute, yet breast milk is the only natural food product which is complete in its content of nutrients, which can serve as the only food of a human during his period of most rapid growth, and which is produced on every continent.

There exists a crisis in infant feeding practices and yet one that has neither caught the headlines, nor interested the economists, despite its huge economic implications, and it is an issue which most nutritionists have ignored.

Breast Feeding in Different Parts of the World

We can only make educated guesses about breast milk production, because food production figures, be they Food Balance Sheets or other reports, seldom include breast milk.

In the world there are three situations found in different places. There are those areas first where the majority now bottle feed their infants; second those where breast feeding remains the principal means of infant feeding; and a third intermediate group which are mainly in transition from breast to bottle.

Almost all of North America, Western Europe and Australasia have become arid zones and fall into the first group. Their yield of breast milk in relation to their populations is extremely low. Only a few oases remain in these continents. In several Caribbean nations, in certain parts of Latin America, in some Asian countries such as Hong Kong and Singapore, and in a number of urban centers elsewhere only a minority of mothers are still breast feeding their 3 month old infants. These nations and communities also fit into the first group.

The second group where breast feeding still predominates includes a large part of Asia including China and India, the world's most populous nations, and nearly all of black and brown Africa.

The third group where bottle feeding is to a greater or lesser extent replacing breast feeding includes many urban populations in Asia and Africa, much of Central and South America, and some of Eastern Europe.

Very few countries regularly collect and publish figures on rates and duration of breast feeding at different ages. The World Health Organization is now sponsoring a study on breast feeding in several countries. To illustrate the situation in a few countries figures are presented from studies undertaken by our group at Cornell. These are based often on small samples and in most cases the data were collected as part of a nutrition study not related to the prevalence of breast feeding (Table 1).

In St. Vincent where we have had surveys in 1968 and 1974 an apparent decline in the duration of breast feeding is seen (Table 2) (4).

Transition in Industrialized Countries

The change from breast to bottle in the industrialized countries of North America and Western Europe was not without its serious problems, ones that are similar to those encountered now in the developing countries or poor communities where today the bottle has replaced the breast.

In 1934 in Chicago mortality per 1000 infants in the first 9 months of life was ten times as high in artificially fed, than in partially breast fed infants, and 50 times higher than in totally breast fed children (2). In a study of feeding in relation to morbidity and mortality of infants from birth to 7 months in Liverpool from 1936-1942 morbidity per 1000 was twice as high and mortality more than 5 times as high in bottle fed than in breast fed infants (3).

Transition in Developing Countries

Among countries that have moved rapidly from breast to bottle feeding the situation has been well documented in Chile. The very rapid decline in rates of breast feeding there should prevent complacency in any nation where the prevalence of breast feeding remains high. In Chile in 1960 over 90 percent of infants were breast fed, and just 8 years later it is reported that fewer than 10 percent were breast fed. Mortality rates at 3 months of age were 2.5 times higher for both bottle fed and partially breast fed, compared with children who were breast fed only.

It has been reported that in Mexico over 95 percent of infants at 6 months of age were breast fed in 1960 and this had dropped to about 40 percent in 1966. In Singapore some 80 percent of 3 month old infants were breast fed in 1951 and approximately 5 percent in 1971. There is evidence from many other countries of this very rapid transition (5). It is often accompanied by greatly increased morbidity and mortality due to gastro-intestinal infections, malnutrition and other conditions.

Breast Feeding in Some Socialist Countries

The Peoples Republic of China has undergone rapid industrialization in recent years but the transition from breast to bottle has apparently not occurred there. Reports indicate that by far the majority of Chinese infants are breast fed. The government has taken steps to allow the high number of working mothers to bring their babies to work, to have them well cared for, and to be breast fed there (6). Knowledgeable visitors returning from China are impressed by the health and growth of young children, and by reports of incredibly low infant mortality rates from certain cities from which figures are available. Infant and toddler mortality rates for the whole of China do not seem to be available.

Similar encouragement is given to breast feeding in the Soviet Union and some Eastern European countries including Poland and Yugoslavia, but the breast feeding rates are apparently lower than in China, though much

higher than in the countries of Western Europe at comparable stages of industrialization.

Reasons for the Decline in Breast Feeding

The assumption is often made that a decline in breast feeding is almost inevitable where there is industrialization and urbanization, where many women are employed in the labor force, and where raised incomes and "modernizing" influences are improving the quality of life. There is a tendency to state that bottle feeding is an inevitable accompaniment of development. I wish to dispute this dogma, because it would be dangerous if it were to become entrenched.

The reasons commonly given by mothers for discontinuing breast feeding are worth examining. A part of a review of the literature by Almroth (7) is given in Table 3. This shows that mothers' employment was given as the reason for weaning the child from the breast in at the most 6 percent of cases.

An examination of the present pattern of breast and bottle feeding in the world shows that there is a poor correlation between, for example, levels of industrialization or of female employment and rates of bottle feeding. The first five nations in the world to develop nuclear bombs were the U.S., Russia, Great Britain, France and China. Three of these countries feed most of their infants from the bottle and two from the breast. Peking is as industrialized as Paris; Moscow is as urbanized as Manchester; and Leningrad has a higher rate of working women than does Los Angeles. Yet the majority of infants in Peking, Moscow and Leningrad are breast fed, whereas in Paris, Manchester and Los Angeles the huge majority are bottle fed.

If factors such as industrialization, urbanization and women in the labor force are not the major determinants of the shift from breast to bottle, what can we conclude from the different patterns of infant feeding in the world? Clearly in the examples given above the differences are in part at least ideological and political. In general then the industrialized countries where bottle feeding is now the rule are capitalist and those where breast feeding remains common are socialist. However some socialist countries are among those in transition from breast to bottle, and in many capitalist countries, all of them developing, breast feeding predominates. Surely we are not willing to capitulate and state that bottle feeding with its attendant high rates of infant morbidity and mortality is an inevitable component of a capitalist or non-socialist system. In Norway and Sweden which are democratic countries with a free enterprise system, there has been a very significant shift from bottle to breast feeding in the period since 1970. In Israel also breast feeding is widely practiced.

Four conditions that are important in the spread of bottle feeding are:

(a) An absence of legislation or government action to ensure optimum care for infants and children of mothers in the labor force;

(b) A medical care system which concentrates on curative, not preventive, medicine where doctors have a strong professional organization which sometimes acts against the public welfare and where profits from private medical care are high;

(c) A system which encourages private industry to act aggressively to change dietary practices in the interests of profits and with disregard for human health and welfare;

(d) A government which is much influenced by large industrial corporations and is reluctant to control them or their promotion of infant foods even in the public interest.

Developing countries where breast feeding predominates, and where there is real concern about infant and child health, could take steps to slow, or reverse, the trend towards the bottle, and this would not require a political revolution. A democratic capitalist country could:

(a) Examine the system of mass communications and regulate these so that they serve the public good;

(b) Take appropriate measures to ensure that the infants and children of working mothers get adequate care, including the right to be breast fed;

(c) Insist that the medical profession have a positive, not a negative, influence on the practice of breast feeding;

(d) Consider appropriate legislation to control the promotion or even the availability of breast milk substitutes (for example, newly independent Guinea Bissau has taken the radical step of making these available only on prescription) and limit the influence and power of multinational corporations and of national food manufacturers;

(e) Introduce an education campaign aimed at maintaining high rates of breast feeding.

Consequences of the Shift From Breast to Bottle

The adverse consequences resulting from bottle feeding by low socioeconomic mothers have been well documented elsewhere (8,9). These include:

(a) Development of protein-calorie malnutrition, especially nutritional marasmus, due mainly to overdilution of high cost breast milk substitutes.

(b) A very high prevalence of diarrhea and gastro-intestinal infections in bottle fed infants due to contamination of the formula or bottle in households where facilities are poor and knowledge of hygiene is low.

(c) A reduced immunity to disease because no formula provides the immune globulins and white cells of colostrum or early breast milk.

(d) A lower level of mother-infant contact and interaction with consequent effects on behavioral development.

(e) An increased risk of obesity.

(f) Earlier return of ovulation and therefore greater risk of early pregnancy.

These serious consequences which are due to inappropriate bottle feeding, though well described, have not been adequately assimilated by physicians and by health policy makers. In many countries bottle feeding may be the major indirect cause of infant morbidity and mortality yet steps to control it attract little attention and few health dollars are used for its control. In a large part of the developing world breast feeding may be preventing more births than are all other family planning efforts combined including the pill, the IUD, the condom and abortions. Yet breast feeding is hardly considered in population control programs and protection or promotion of breast feeding figures not at all in the huge family planning budgets of most countries.

Adverse Economic Consequences for the Family and the Nation

Among the most serious adverse consequences of the decline in breast feeding are the economic ones for the family and the nation. These continue to be relatively ignored.

While working in Tanzania, over 10 years ago, I published evidence to indicate that the cost of adequately bottle feeding a 6 month old infant was equivalent to half the minimum wage of that country (10). The minimum wage in Tanzania, like that in many countries, is higher than the mean family income. How can a family allow over half their income to be spent on the food for their youngest member. It was also estimated in that same year that the production of human milk on the mainland of Tanzania was 40 million gallons, worth perhaps U.S. $22 million, if it had to be replaced with powdered cows' milk, which would have needed to be imported.

The situation has not changed much since then. In Kenya in 1976 I worked on a World Bank Study where adult road workers were paid 6 shillings (about 80 U.S. cents per day). The cost of a suitable manufactured milk formula fed in adequate amounts would cost over half this amount (Table 4).

The situation is perhaps worse in India. Reutlinger and Selowsky (11) have undertaken an interesting study on nutrition and poverty. In an examination of data from Calcutta they suggest that about 50 percent of an employed mother's earnings will need to be spent to replace breast milk not provided, assuming that she continues to breast feed while at home. My calculations from their data indicate that if she stopped breast feeding altogether and she used cows' milk, she would spend 75 percent of her income, and if she used a manufactured product, she would have to use her whole income. Why should any woman go to work, often at an unpleasant job, and spend her entire income on a replacement for breast milk. This is an example of all cost and no benefit.

From these Calcutta data Reutlinger and Selowsky (11) show that the marginal propensity to spend on infant foods from additional family income is extremely low and only about 5 percent. This means that for every additional 100 rupees earned only 5 rupees would be spent on infant foods. They conclude that higher incomes of the kind described not only may fail to reduce malnutrition, but on the contrary may increase infant undernutrition.

It is worth citing another example where employment of mothers, although increasing income, had the result of reducing nutrient intakes of young children. In a vitamin A research project in the Philippines in which we have been following 1700 children in 12 areas for three years, we too have found a negative nutritional impact resulting from employment of women in the labor force. Our interest was in consumption of vitamin A by study children. Our findings indicate that employment of mothers increased family income but reduced by almost half the vitamin A intake of young children.

"Commerciogenic" Nutritious Foods

In 1971 Jelliffe (12) first coined the term commerciogenic malnutrition and commerciogenic nutritious foods. He was referring to the increased production and use of commercially produced foods often high in their protein content being marketed as weaning foods. They include milk products for infant use, semi-solid manufactured weaning foods, high protein snack foods and beverages, various commercial mixtures of cereal, legume and oil seed flours, and similar products.

We have examined the limitations and dangers of the use of these commercially marketed products by poor families in low income countries. Clearly the disadvantages found are not applicable to situations such as famines where there may be a free distribution, or government programs where there is a marked subsidization of these products.

The likely nutritional effect of the purchase and use of certain commerciogenic nutritious foods available in India was investigated by us using a simulation study (13). In the 30 percent of poorest families a survey in Maharashtra showed that 80 percent of income was spent on food and 20 percent on essential nonfood items. It is assumed that if commercial infant or weaning foods are purchased the money will come from the 80 percent used for food expenditures. These low income families using traditional foods purchase 1000 Cals. at a cost of 0.2 rupees and 100 grams of protein for 0.6 rupees. The cost of 1000 Cals. and of 100 grams of protein from commerciogenic high protein foods is shown to be 14 to 40 times higher and for 100 grams of protein to be 6 to 20 times higher than in traditionally purchased foods (Table 5). Therefore the diversion of any money spent on traditional foods will result in a reduction of not only calories but also of protein for the family. The purchase of these so called low cost-high protein nutritious foods is apparently having a markedly negative nutritional effect in India. Examination of the situation in Kenya and the Philippines reveals a similar situation. It is likely to be so in nearly all low income

countries where poor families get most of their calories, protein and other nutrients from locally produced foods.

The need to reduce malnutrition has been stated as the rationale for the development of these low cost nutritious foods. International and bilateral assistance has been given to help in their development. There are serious dangers in the continuation of such efforts. Again the commercial advertising and promotion of these products has often been aggressive, they have sometimes been untruthful, and they have influenced the poor to purchase them. It is often falsely suggested that the commercial product is nutritionally superior to cheaper products that are customarily consumed in the community.

Powerful messages are used to convince parents that product X will result in good health, improved stamina and increased growth of children. No consideration is given to the fact that the purchasing of product X will result in the replacement of some traditional food. By buying a package of a commercial food the poor are perverting their overall food budget. The replacement as we have shown will all too often result in the availability of fewer calories and of less protein and other nutrients than in their original food purchases.

As in the case of infant formulas, the beneficiaries are of course the commercial companies including several of the multinational corporations (14) and sometimes also countries like the U.S. who are the main producers of soyabeans which are often included in these products.

Improving Infant Nutrition

What steps can be taken to improve infant nutrition in developing countries? Clearly any steps to encourage breast feeding are desirable in those countries and communities where bottle feeding is a serious cause of increased morbidity or mortality, or is likely to be so. Some possible measures have been suggested. Certainly commercially available weaning foods should where possible be prevented from distorting the food budgets of poor people. Often locally available cereals, legumes, fruits and vegetables as traditionally fed provide optimum diets for young children.

If a government accepts that bottle feeding and processed infant and children's foods are the inevitable pattern in their country, then appropriate steps need to be taken. These products both for infants and young children should be made available free or at highly subsidized costs for poor families or even for all families. Britain took this step after the Second World War providing free National Milk Formula to all families with infants irrespective of family income, and the Soviet Union takes similar steps. The difference was perhaps that Britain accepted the demise in breast feeding while Russia does not. The United States with its WIC Program is taking rather similar steps to those in Britain but aimed sensibly at low income families.

In the case of special baby foods, other than infant formulas, if these are to be subsidized rather than issued free, then the level of subsidization should be such that it ensures the availability of the

product at a cost per 1000 calories no higher than that of the main staple food and at a protein cost comparable with foods like legumes available in the local market. If this is not done then the purchase of these nutritious manufactured foods may have a negative effect on child nutrition.

Education programs and campaigns deserve consideration in plans to prevent the spread of bottle feeding or to promote breast feeding. The educational approach receives special and detailed consideration by Ted Greiner in the present monograph.

In my view education programs should be aimed mainly at those groups and communities where breast feeding is still normally practiced, but where bottle feeding is beginning to gain popularity, or may be expected to in the future. The education then is largely "preventive", encouraging people to maintain a valuable traditional feeding method while indicating the dangers of the alternative. This is similar to efforts taken to prevent young persons from ever taking up the cigarette smoking habit, rather than concentrating on cigarette smokers. Certainly education on the health hazards, the economic implications and the other problems associated with bottle feeding, and the advantages of breast feeding, should also be directed at those who have already switched to the bottle. But this "curative" approach is much less likely to succeed.

In Tanzania for example there has been an effort made to suggest that breast feeding is the Tanzanian method of infant feeding and that there is no sense in changing to a Western method when the Tanzanian method is superior. This surely is a sound approach, which can be compared in the United States with the "black is beautiful" campaigns which helped restore pride in black people, and did serious damage to the purveyors of skin whiteners and hair straighteners.

Ted Greiner's discussion of communication and education of the public are thought provoking and original. His suggestions certainly deserve to be tried and evaluated. His previous monograph was widely read and has proved to be quite influential. I predict that the present monograph will receive an even wider readership. It is the result of careful scholarship, wide reading and deep thinking.

M. C. Latham

Table 1

Length of Breast Feeding in Different Countries
Data from Cornell Studies[1]

Country, author, year and number	Age breast-feeding stopped			
	Never br. fed %	0-5 months %	6-12 months %	Over 12 months %
Colombia (Englberger) 1972 (N = 135)	9	26	51	14
Hong Kong (Woo) 1974 (N = 113)	50	32	18	0
N.E. Brazil (Drummond) 1974 (N = 82)	-	13	79	8
India - Punjab (Levinson) 1971 (N = 496)	-	near zero	8	92
Jamaica (Evans) 1972 (N = 91)	-	24	64	12
Jamaica (Almroth) 1976 (N = 138)	-	26	52	[illegible]
Philippines (Popkin) 1975 (N = 314)	-	12	11	77

[1] These are taken from unpublished Masters degree or Ph.D. theses.

Table 2

Length of Breast Feeding in St. Vincent[1]

	Age breast feeding stopped		
	0-4 months %	5-12 months %	Over 12 months %
1967 (Beaudry) N = 163	15	69	16
1974 (Greiner) N = 193	31	54	15

[1] From T. Greiner (4).

Table 3

Commonly Given Reasons for Weaning from Breast[1]

	Baby old enough or weaned self %	Illness mother or child %	Insuff. breast milk %	Pregnancy %	Work %	Other %
Philippines (Guthrie 1964) N = 245	26	6	7	37	6	18
Colombia (Meija 1968) N = 200	21	9	32	16	3	19
Nigeria (Ransome-Kuti 1968) N = 200	44	4	-	2	0	50
St. Vincent (Greiner 1976) N = 164	45	13	1	8	4	29
Jamaica (Almroth 1976) N = 54	35	15	17	0	6	27

[1] Adapted from S. Almroth (7).

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Table 4

Cost of Bottle Feeding Relative to Wages

	Approx. monthly wage	Cost of formula or milk	Required marginal propensity to spend on milk	Percent of wage
Tanzania[1] (1964) (Latham)	132 Shs.	68 Shs.	0.51	51%
Kenya[1] (1976) (Latham)	150 Shs.	88 Shs.	0.58	58%
India[1] (1976) (Reutlinger and Selowsky)	120 Rs.	91.5 Rs.	0.76	76%

[1] Tanzania and Kenya data based on cost of manufactured powdered formula; India data on cows' milk.

Table 5

Cost of Purchasing 1000 KCal and 100 Grams Protein Using Selected Foods

	Rupees per 1000 Cal.	Rupees per 100 g. protein
Processed commercial products		
Uniprotein	2.9	8.0
Protinex	7.9	9.8
Skim milk powder	1.7	1.7
Multimixes (non-commercial)		
Hyderabad mix	0.3	0.9
Family purchases		
Normal diet (Bottom 30% of incomes)	0.2	0.6

References

(1) Wade, N. 1975 International agricultural research. Science 188, 585-588.

(2) Grulee, C. G., H. N. Sanford and P. M. Herron 1943 Breast and artificial feeding. JAMA 103, 735-748.

(3) Robinson, M. 1951 Infant morbility and mortality. A study of 3266 infants. Lancet i, 788-794.

(4) Greiner, T. 1976 Commercial infant foods and malnutrition in St. Vincent. Paper presented at the American Anthropological Association Annual Meeting in Washington, D. C., November 19, 1976.

(5) Berg, A. 1973 The Nutrition Factor, 1st Edition. The Brookings Institution, Washington, D. C.

(6) Wray, J. D. 1976 Breast feeding and the urban poor of the Third World. Presented at Biosocial Aspects of Breast Feeding Symposium.

(7) Almroth, S. 1976 Breast feeding practices in a rural area of Jamaica. Unpublished thesis, Cornell University.

(8) Jelliffe, D. B. and E. F. P. Jelliffe 1975 Human milk, nutrition and the world resource crisis. Science 188, 557-560.

(9) Latham, M. C. 1975 in The Promotion of Bottle Feeding by Multinational Corporations, by T. Greiner, Cornell Internat. Monograph Series, Ithaca, N. Y.

(10) Latham, M. C. 1965 in Human Nutrition in Tropical Africa, p. 40-41, FAO Rome.

(11) Reutlinger, S. and M. Selowsky 1976 Malnutrition and Poverty. World Bank, Washington, D. C.

(12) Jelliffe, D. B. 1971 Commerciogenic malnutrition? Time for a dialogue. Food Technol. 25, 55-59.

(13) Popkin, B. M. and M. C. Latham 1973 The limitations and dangers of commerciogenic foods. Amer. J. Clin. Nutr. 26, 1015-1023.

(14) Greiner, T. 1975 The promotion of bottle feeding by multinational corporations: How advertising and the health professions have contributed. Cornell International Nutrition Monograph Series No. 2.

REGULATION AND EDUCATION:

STRATEGIES FOR SOLVING THE BOTTLE FEEDING PROBLEM

by
Ted Greiner

Clearly the most significant immediate cause of the high levels of malnutrition found among infants in many developing countries is the way they are fed. Any gross departure from the ideal pattern of infant feeding, that is, several months of exclusive breast feeding followed by gradually increasing supplementation of breast milk with so-called weaning foods high in caloric and protein density, is likely to prove detrimental. In the past, the failure to carry out properly the supplementation part of the pattern may have been the major immediate cause of malnutrition. But in recent decades another deviation from the ideal pattern is seriously compounding the problem. It is the widespread shift from breast feeding to bottle feeding by thousands upon thousands of Third World mothers (Berg, 1973: 91).

THE PROBLEM: BOTTLE FEEDING

Bottle feeding can cause malnutrition in two interrelated ways. First, milk is expensive for low income families. It often costs 25 to 50 percent of their income to buy an adequate quantity. (Appendix 1 is an attempt to put the cost of bottle feeding in rough perspective in one developing country.) This puts pressure on the mother to "stretch" each tin of milk by overdiluting her baby's feeds, resulting in a gradually worsening state of undernutrition.

The second problem with bottle feeding is that low income families usually do not have access to refrigeration, a wholesome water supply, or the utensils and fuel necessary for sterilization and sanitary preparation of bottle feeds. (Appendix 2 illustrates some of the problems encountered by Third World mothers in attempting to practice hygienic bottle feeding.) The bottle and its contents are thus contaminated and cause infection which greatly aggravates malnutrition (Latham, 1975). Particularly dangerous is the gastroenteritis manifested as diarrhea which is commonly caused by unhygienic bottle feeding, because it reduces absorption of nutrients, and can quickly cause fatal dehydration in infants (Gordon et al., 1964).

The detrimental effect of bottle feeding may translate to a powerful deterrent to development at the national level in many developing countries. Malnutrition caused by bottle feeding may lead to a failure to achieve optimal physical and mental development; treatment and rehabilitation of its victims is a costly drain on medical personnel's time and on health facilities. As Appendix 3 illustrates, the cost of the cows' milk necessary to replace breast milk can be a financial burden, especially when all or a large portion of it must be imported using scarce foreign exchange. Furthermore, the shift from breast to bottle could contribute to problems of overpopulation. By contributing to a high infant mortality rate it may increase parents' incentives for having a surplus of children as a form of old age security. More directly, it removes the now well-documented effect of delaying the onset of ovulation provided by unsupplemented breast feeding. Rosa (1975) estimates, based on breast feeding and family planning as they are now practiced in the Third World, that "approximately one-third more protection is provided by lactation amenorrhea than by family planning program contraceptive methods."

THE SOLUTION: REMOVE CAUSES, EDUCATE

There are, perhaps, three alternative paths which societies might follow in attempting to deal with the shift from breast to bottle feeding. First, attention could be directed toward providing inexpensive artificial breast milk substitutes for all (Monckeberg, 1970, discusses how such an approach failed for Chile), and teaching mothers how to practice safe bottle feeding (Appendix 2 provides a few examples of the many problems this would entail). Second, attention could be focused on economic development in order to create for Third World families those very conditions which allow bottle feeding to be successful in developed countries. Unfortunately, this is likely to be a relatively slow process and the high toll of malnutrition and death that in the meantime would be caused by bottle feeding would not only be unacceptable on humanitarian grounds, it would in itself prove a significant stumbling block to economic growth (Berg, 1973: 9-30).

The third alternative would involve simultaneously (1) increasing research on the causes of the shift in infant feeding practices, (2) planning strategies to remove those causative factors which are known, and (3) vigorously moving to educate all segments of society about the advantages of breast feeding and the disadvantages of bottle feeding. Of course, this does not remove the need for discretely providing inexpensive infant foods and instruction on bottle feeding in certain individual cases. Neither does it imply that every effort should not be made to achieve rapid economic progress.

The rest of this paper will deal with the three aspects of this third alternative.

WHAT ARE THE CAUSES?

Two interrelated processes are involved in the shift from breast to bottle: the decline in breast feeding and the rise in bottle feeding. However, for a given mother this does not necessarily mean that at a certain point in time she switches her baby from total breast feeding to total bottle feeding. In fact, in many parts of the Caribbean, for example, most babies may spend a longer period of time receiving both breast and bottle simultaneously than either exclusively.

Lactation failure, much less common in the Third World than in industrialized countries, is seldom of a purely biological nature. Dwyer (1975) states that "only one percent of mothers have serious breast feeding problems and two to three percent have temporary problems due to illness." Although it appears that with few exceptions even a moderately malnourished mother produces milk of adequate quality, much more research is needed, especially on the effects of mothers' diets on the quantity of their milk.

On the other hand, there is a strong psychological component to successful breast feeding (Newton and Newton, 1962). Mothers must be confident in their own ability to breast feed in order to succeed (Jelliffe and Jelliffe, 1974). In rapidly urbanizing areas especially,

the supportive extended family which helps build and maintain this confidence is being undermined (Jelliffe, 1970).

The modernization process often leads to many changes in the status of women which may affect infant feeding patterns. Undoubtedly, their increasing participation in the labor force can contribute to a shift from breast to bottle. However, this has often received exaggerated attention. E. F. P. Jelliffe (1975) cites several studies showing the low percentage of mothers employed in the Third World, and the even lower percentage of women who stopped breast feeding because of employment outside of their homes. In a recent review of the literature, Almroth (1976) found that employment was given as the reason for weaning by an average of only 6 percent of mothers surveyed (unweighted mean for 11 studies with adequate data).

It is often stated that poor women may adopt bottle feeding by way of emulating women with higher status. Though this may sound plausible, further research is needed to establish the validity of this "trickle down" theory with respect to infant feeding practices. Research in other areas suggests it may not be such a powerful motivating factor as previously has been assumed (C. W. King, 1969). However, Post (1976) is probably correct when he says, "If artificial feeding is an indicator of improving social status and understood to be such an indicator, its spread among the middle classes seems assured. If breast feeding is a sign of poverty, traditional or the 'old ways', then it is a cultural indicator to be rejected by those able to do so."

Unfortunately health professionals often have contributed to the problem, because of inappropriate or inadequate training with respect to infant feeding in a Third World context, and because of the influence of the commercial formula manufacturers. Thus, maternity ward and clinic practices often encourage bottle feeding. Programs to provide supplemental infant foods have had detrimental effects in some cases, although the case of Chile, often cited as an example (Monckeberg, 1970), has been disputed (Hakim and Solimano, 1975: 41).

ONE IMPORTANT CAUSE: PROMOTION OF COMMERCIAL INFANT FOODS[1/]

Having learned how to create demands and generate tastes for their products at home, many large multinational corporations have turned their attention toward expanding markets abroad, including those in the

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1/ The term "infant food" is used to encompass all products commercially produced and promoted for infant feeding. In most developed countries this basically includes infant formulas (milk, soy or meat-based preparations designed to meet all the nutritional needs of an infant), strained baby foods, and infant cereals. But in many developing countries other products are often "positioned" and promoted for use in bottle feeding such as evaporated milk, sweetened condensed milk, full cream powdered milk, and glucose. Commercial cereals and strained foods are included in the definition because (1) they are inordinately expensive, (2) they are often promoted for use by young infants, which can contribute to lactation failure, and (3) some companies recommend substituting some breast feedings with their products at early ages.

developing world. This is particularly true for manufacturers of infant foods. Nestle's Annual Report for 1971 says: "In Europe, progress was slowed down by a certain stagnation in the market due, inter alia, to the continuously declining birthrate. In the developing countries, demographic growth, the rising standard of living and, generally, the endeavors to promote infant nutrition, offer good prospects for our products." An article entitled "Breast vs. Bottle" in Abbott Laboratories, volume 2, 1975, says: "From 1969 to 1974, for example, sales of Abbott pediatric products overseas showed an increase of 86 percent. Infant nutritionals, of course, are an important segment of these sales." And Wyeth says, (American Home Products, 1976b): "Wyeth estimates growth in infant formula products in Mexico of 5% to 10% and anticipates a leveling off in Europe during 1976. In South America, Africa and Asia, Wyeth also foresees growth this year of 5% to 10% provided that economic and political conditions in these areas are relatively stable."

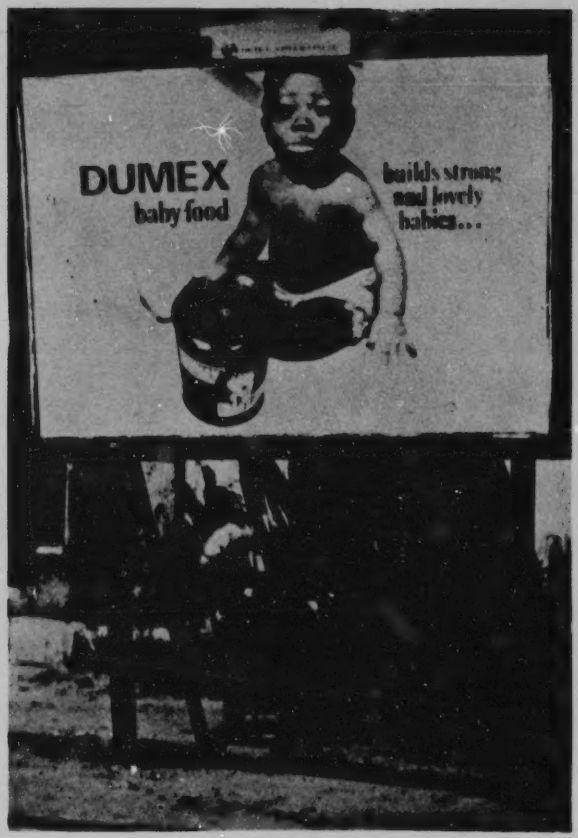
Not surprisingly, multinational corporation subsidiaries located in developing countries are willing to devote significant budgets to exploiting such markets. In Kenya in 1973 consumer goods subsidiaries spent an average 3.5% of their sales revenues on advertising, whereas infant food subsidiaries averaged 6% (Langdon, 1975). A wide variety of promotional techniques have been employed in such countries. Advertising is the most obvious technique and utilizes all possible media in aiming messages to the general public, retailers, health professionals, and especially the so-called "target audience", women who are pregnant or are new mothers.

ADVERTISING TO THE PUBLIC

Outdoor displays such as billboards (see Figure 1) or posters (Figure 2) are widely used in some areas. One medium which is especially useful for opening up new rural markets or for spreading the word about a new product, is the company van equipped with a public address system and facilities for giving away free literature or samples. Direct mailing is sometimes used as an efficient way of singling out the target audience. Movie theaters are a common advertising medium in many developing countries. In Barbados, for example, cinema campaigns were staged by Carnation Evaporated Milk from February 1965 to January 1966, by Glaxo's Farex infant cereal and Ostermilk infant formula from September 1965 to January 1966, by Heinz baby food from October 1965 to January 1966, and by Wyeth SMA infant formula from October 1971 to January 1972.

Although newspapers and television are used in many countries, this quote from an executive in a Kenyan subsidiary of a multinational infant food company is probably widely generalizable: "We advertise quite a lot, on one kind of media advertising mainly--that is radio. We don't believe in press advertising, since there are not so many reading daily papers. But radio, from what our investigations have shown, is the best, and we rely quite heavily on radio advertising" (Langdon, 1975). In monitoring radio advertising for a three week period in 1973 in Kenya, Langdon found that Nestle's Lactogen, the most heavily advertised infant formula, accounted for over 11% of all Swahili radio advertising time, more than used by virtually any other brand name product.

Figure 1. Billboard in Nigeria



This photograph was taken by Mike Muller in 1975.

Figure 2. Poster Advertising Dumex Infant Food Free Gift Scheme

Dumex is a subsidiary of the Danish multinational Eastern Asiatic Company. Such posters were common along country roads 250 km north of Singapore in Malaysia where this photograph was taken in February 1976. It was provided to the author by Torben Mahneke.

In a study of infant food advertising in several African countries, Muller (1976a) noted heavy use of radio ads such as the following spot which, in 1974, was broadcast 135 times a month in the different languages of Sierra Leone (accompanied by fast-paced music and partly sung):

> Bring up your baby with love and Lactogen.
>
> Important news for mothers! Now Lactogen is even better, because it contains more proteins plus vitamins and iron, all essential for making your baby strong and healthy. Lactogen Full Protein now has an even creamier taste and is guaranteed by Nestle.
>
> Lactogen and love.

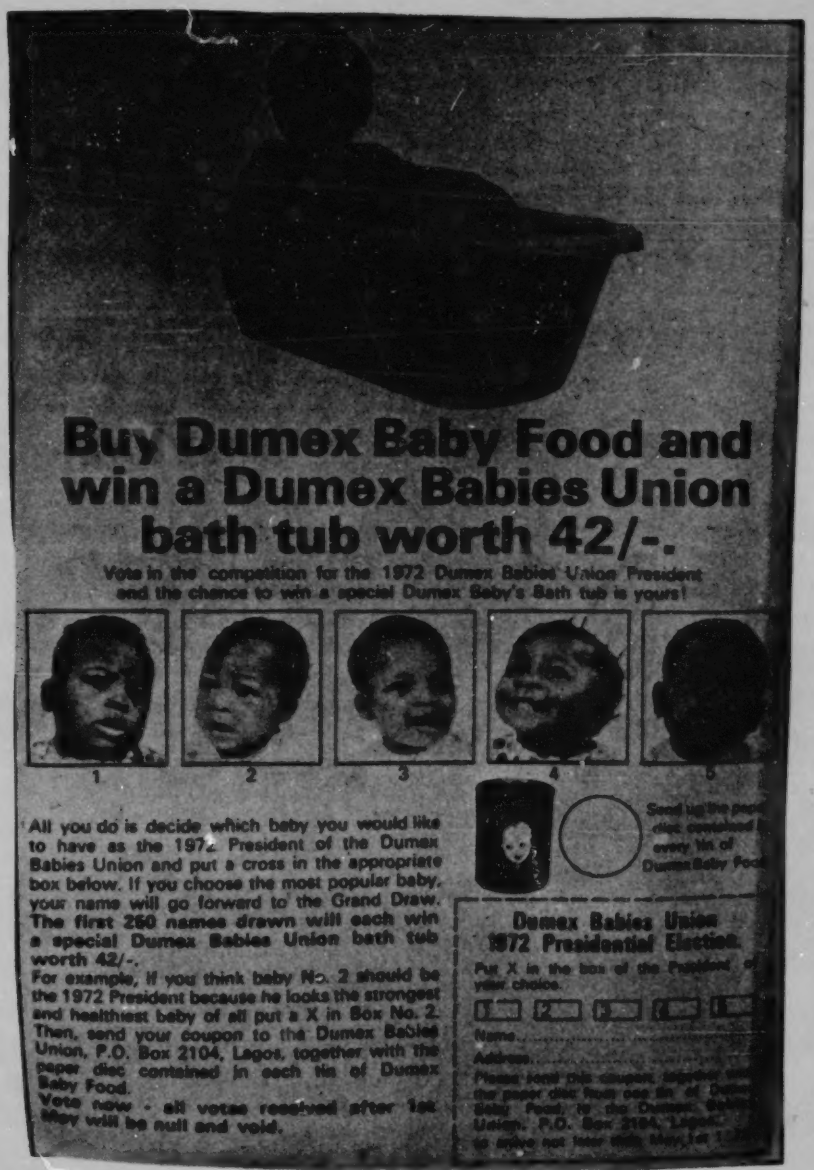
It is worth noting here that companies are not content with merely directing a media message at a passive audience. Besides making the message exciting, applicable to daily life, and emotional in its impact, the attempt is to involve the consumer as much as possible. This includes the use of premiums and gifts as in Figure 2, and the establishment of baby clubs as in Figure 3. The Nestle Club in Dakar, Senegal encouraged parents to send in pictures of their babies, and, as the advertisement in Le Soleil newspaper for January 6, 1972 says, "Nestle sends very pretty presents to the most beautiful babies, and the best photo received each week is publicized in the papers." Local social workers reported that their office was "besieged" by parents asking to have pictures taken of their babies, since they did not have the money for a photograph. Another promotional gimmick which can mobilize a whole community is a sweepstakes or a baby contest. In the Kingston, Jamaica Daily Gleaner for June 16, 1971 is the full page announcement of the 11th Anniversary Mead Johnson Olac Baby Show. Awards consisted of Mead Johnson products. To be eligible, "all babies must be fully fed on Olac for at least three months immediately preceding the Baby Shows."

ADVERTISING TO HEALTH PROFESSIONALS

Promotion of infant foods to health professionals tends to follow the same channels as drug promotions. Besides direct mail promotion and advertising in professional journals (see Figure 4), "detail men" may be hired to visit doctors personally. Even dairy companies adopted this typical drug company technique as illustrated in an early journal advertisement in Figure 5. Although its share of the infant food market must be small, Carnation is still placing full page ads in the American Journal of Public Health (as of November, 1976).

It should be stressed that "health professional" in this context is not limited to the doctor. As Ballarin (1970), President of Nestle's, Brazil, points out, "...in many places of the hinterland where living conditions are more difficult, the number [of doctors] is scarce and sometimes even nonexistent. In these cases the role of the pharmacist as a counsellor, an adviser is very important." In other countries it is the district nurse, the midwife, the paraprofessional, or all who are the target for promotion.

Figure 3. Advertisement Concerning Dumex Babies Union


Buy Dumex Baby Food and win a Dumex Babies Union bath tub worth 42/-.
Vote in the competition for the 1972 Dumex Babies Union President and the chance to win a special Dumex Baby's Bath tub is yours!
1
2
3
4
5
All you do is decide which baby you would like to have as the 1972 President of the Dumex Babies Union and put a cross in the appropriate box below. If you choose the most popular baby, your name will go forward to the Grand Draw. The first 250 names drawn will each win a special Dumex Babies Union bath tub worth 42/-.
For example, if you think baby No. 2 should be the 1972 President because he looks the strongest and healthiest baby of all put a X in Box No. 2. Then, send your coupon to the Dumex Babies Union, P.O. Box 2104, Lagos, together with the paper disc contained in each tin of Dumex Baby Food.
Vote now - all votes received after 1st May will be null and void.
Dumex Babies Union 1972 Presidential Election.
Name.....
Address.....

From Spear magazine, Lagos, Nigeria, June, 1972. Note that contestants were required to buy a tin of Dumex.

Figure 4. Lactogen Advertisement in a Journal for African Paraprofessionals in the Health Fields

No need to worry about me...
I am building up on Lactogen!
Modified and enriched powdered Milk, containing nine added Vitamins and Iron, prepared especially for infant feeding.
... one of the very fine products made by
NESTLÉ
the company that takes good care of millions of babies on five continents. Founded by Henry Nestle in 1866 at Vevey (Switzerland), Nestle employs today 86,000 people in over 220 factories and 650 administrative centres, sales branches and depots.
NESTLE — symbol of security and service the world over!

This advertisement was taken from the March 1972 issue of AFYA, published in Nairobi, Kenya.

Figure 5. Advertisement from Pediatrics, September, 1948

Will you Open the Door, Doctor?

SOME day soon a Pet Milk Company representative will ask for a few minutes of your time. When he comes to your office we hope that you will "open the door." We think he has a worth-while message. Otherwise he doesn't ask for your valuable time.

He has nothing to sell. ***Service to the physician*** is his primary objective. Here are some of the things he is trained to do:

Answer your questions about Pet Milk and its role in infant feeding.

Provide, for ready reference, reprints of scientific articles reporting clinical and laboratory studies in the field of infant nutrition.

Supply time-saving services which simplify formula writing, prescription of solid foods, weaning, etc.

Furnish booklets for distribution by the physician to mothers, containing instructions on formula preparation and other phases of baby care, thus saving the doctor valuable time.

The next time a Pet Milk representative comes to your office, we hope you will see him. He will not waste your time. He will discuss milk, not medicine. We believe that you will be pleased that you "opened the door" to him.

PET MILK COMPANY, 1416-I Arcade Bldg., St. Louis 1, Missouri

Pet Milk, the original evaporated milk, is always safe, always uniformly nutritious, always easy to digest—and economical, costing less generally than ordinary milk.

Another promotional method is what D. B. Jelliffe refers to as "manipulation by assistance". This involves providing health professionals with a wide variety of free goods and services. In addition, as Brown (1973) writes, "many medical conferences are supported by the commercial [infant food] firms, free cocktail parties are provided at all major conventions, and in some instances research is underwritten by the food companies." Ledogar (1975: 144) provides several examples of such manipulation by assistance in Brazil. A further example is provided in Figure 6, an advertisement for a fellowship offered to doctors by Nestle, the company with the largest sales of infant food in the Third World. Ironically it is located just below an editorial stressing the dangers of the spread of bottle feeding and the profession's profound ignorance in preventing it. It is interesting also that the Fellowship was administered by the International Children's Center in Paris, an organization devoted especially to the improvement of health and well-being of children in the tropics.

The possible effects of "manipulation by assistance" are suggested in an editorial by Cagas (1972): "Recently the [Philippine Pediatric] Society was under attack from the lay press with the indictment that after we pediatricians are 'wined, dined and gifted', we now act as apologists for the milk companies in lobbying for a no price ceiling for infant formulas." He also pointed out that the doctors' acceptance of "pampering" from infant formula companies was partly responsible for the high cost of infant formula.

ADVERTISING THROUGH HEALTH PROFESSIONALS

Still another method of promoting infant foods is what Jelliffe calls "endorsement by association". This consists in providing health professionals with a variety of free "tools": "educational" posters, calendars, and infant care and feeding literature, as well as free samples of the company's product. It is a particularly powerful phenomenon which can act even apart from the effort of the companies. For example, in St. Vincent, West Indies, a group of mothers were found to be using an unusual brand of milk powder for their babies because they had noticed that a small local hospital for malnourished infants was using it (Greiner, 1977). One can only imagine how much more powerful the endorsement must be when free samples are given out by health professionals or provided by hospitals or clinics. Infant food companies expend enormous sums of money on these samples--about 4% of sales in the case of Wyeth, for example (American Home Products, 1976b).

The importance of the hospital as a means of promoting infant formula in the U.S. is clear from the following quote from Advertising Age, March 17, 1975, page 8:

> Baker [an infant formula company that went out of business in December, 1974] has charged the two companies [Abbott and Bristol-Myers] with paying cash grants to hospitals as well as supplying free infant formula in return for the hospital staff feeding newborns these brands and recommending that mothers continue using them at home. The suit also notes that the hospitals distribute promotional literature.

Figure 6. Advertisement for the Nestle Fellowship

and, if possible, augmented. With the latter in mind, investigations have been carried out in India to determine the effect of locally traditional galactogogues and of protein supplementation with skimmed milk on the output of breast milk in various stages of lactation in poorly nourished Indian women. Preliminary findings showed no increase in yield, although the desirable effect of additional protein intake on the pregnant woman's nitrogen balance has shown by the same group of workers.(1)

Despite the prophylactic importance of breast-feeding, prolonged up to about two years in most lower socio-economic groups in the tropics, there is mounting evidence that the falling off breast-feeding which appears to have swept across the Western world in the last fifty years is also occurring in the tropics among the well-to-do and even, to a lesser, but increasing, extent, among the less privileged poor mothers. As noted by Welbourn in East Africa in a paper aptly titled " Bottle feeding : a problem of modern civilization," the effect of this trend in tropical countries with completely inadequate supplies of animal milk, poor standards of hygiene and low levels of maternal education can only be disastrous.(2) One of the basic aims of nutritional policy in relation to the protein-calorie malnutrition in tropical regions should be based on the realization of the danger of this trend and on a consideration of methods of preventing its spread, a subject about which at present we are profoundly ignorant.

It would be extremely interesting if readers in various parts of the world could express their views on this subject, together with remarks on trends in breast-feeding in towns in their countries.

REFERENCES

(1) Gopalan, C. (1958). *J. trop. Ped.*, 4, 87. Studies in lactation in poor Indian women.
(2) Welbourn, H. F. (1958). *Ibid.*, 3, 157. Bottle-feeding : a problem of civilization.

THE NESTLE FELLOWSHIP

A fellowship of 10.000 new francs is granted every year by the French Nestlé Company to a physician who wishes to do special work in the field of nutrition.

The panel of judges of the fellowship awarded the latter to Doctor Juan Rodriguez Soriano (Barcelona) for the year 1960-1961.

The fellowship for 1961-1962 will be awarded in the Spring 1961, the candidates are requested to send the following papers to the International Children's Centre, Château de Longchamp, Bois de Boulogne, PARIS XVI :

(a) *a Curriculum Vitae* mentioning their work on biological and social problems concerning feeding or nutrition of infants and children.
(b) *a letter of introduction* from one of their Masters,
(c) *a description of the studies* which they wish to pursue with the help of the fellowship.

The candidates must have a sufficient command of the French language.

At the end of their fellowship the fellow or fellows will be expected to remit to the International Children's Centre a scientific paper on the subject which they will have studied during the year of their fellowship.

Everdell and Jacobson (1976) report that 84% of hospitals responding to a Center for Science in the Public Interest (CSPI) questionnaire receive free formula from the manufacturers (the number of hospitals, however, was not reported). They point out that hospitals also receive "honoraria for speakers, financial support for yearly symposia, educational materials for the hospital staff, pamphlets and visual aids for new mothers, and help in planning renovations of the nursery."

Infant care and feeding literature, so-called "baby books", deserve special attention. Industry-published versions are commonly used in Third World countries as educational tools because of limited budgets. Unfortunately these publications tend to glorify bottle feeding as well as the company's particular products. Even when they do not contain blatant advertising for breast milk substitutes, they may subtly contribute to lactation failure. They may stress the many problems that supposedly can occur during breast feeding, thus undermining the mother's confidence in her ability to breast feed, so important to the crucial "milk-ejection" reflex (Applebaum, 1970). Or they may make breast feeding appear unduly complicated by suggesting a myriad of breast and nipple exercises, preparations and cleansings. The Nestle booklet for Asia, "A Life Begins", says, "you should bathe your breasts daily, wiping the nipples with cotton wool dipped in a mixture of spirits and glycerine which will strengthen them and make nursing easier." Such literature commonly recommends practices which are not feasible for the average mother and could help lead to lactation failure, such as the pages illustrated in Figure 7 which contradict the preferred practices of always giving both breasts at each feed and following a "demand" rather than a "timetable" feeding schedule. Most damagingly, "baby books" may contribute to the belief of many mothers that they cannot "afford" to exclusively breast feed. As one mother in St. Vincent put it when asked whether a baby would be healthy if given only breast milk for 4 months, "Yes, but some parent's milk isn't so good. I couldn't afford to buy enough food, so I used Lactogen to keep her" (Greiner, 1977). One Nestle "baby book" given out in St. Vincent, called "Those First Months of Pregnancy", says that a breast feeding mother must eat 3500 calories a day, "and a large portion of this amount must come from foods which are rich in protein: meat, fish, poultry, eggs, dairy products (milk, butter, cheese, yogurt, etc.)." Nestle's baby book for Africa, "The Dawn of a New Life", says that she must drink at least two glasses of milk a day and plenty of good clean water. Some of this information is nutritional nonsense and most of it is impossible for poor mothers to follow.

Are "baby books" put out by infant food companies intentionally biased? Although there is disagreement among health professionals about various aspects of infant feeding, no statements were found in the "baby books" which seemed to err on the side of being over-enthusiastic about breast feeding.

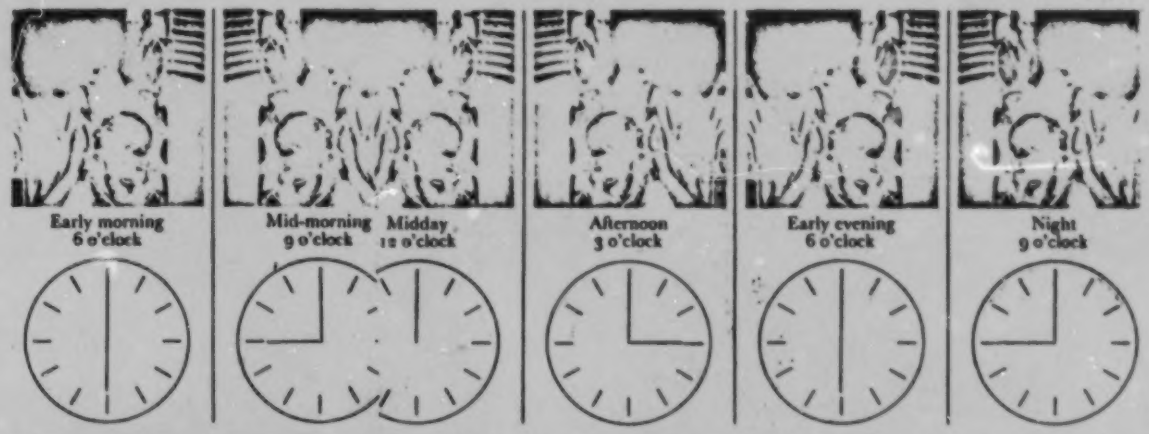
A content analysis of 20 "baby books" put out by infant food companies (using the method described in Greiner, 1975) showed that 2.7 times more print is devoted to bottle feeding than to breast feeding, as well as 1.7 times more pictures of babies being bottle fed than those being breast fed. There were 4.2 times as many negative as positive

Baby's daily Routine

Give the right and left breast alternately, or both if you have only a little milk.

Maximum duration of the feed: 15 minutes. Baby must not fall asleep while feeding, as he would only swallow air while continuing to suck mechanically.

Carefully wash your breasts with boiled water before and after each feed.



Feed Baby 5 or 6 times a day at regular intervals, according to a set timetable.

At the end of the day, take a good night's rest.

When the feed is finished, hold Baby to bring up the wind. Once he has been put to rest, a lot of air in the stomach would cause him distress.

Figure 7. Two Pages from "A Life Begins", an Infant Care and Feeding Brochure for Asia Published by Nestle

statements (with reference to their possible impact on a lactating mother). This contrasts with 8 publications from various health agencies. They contained 2.0 times more print about bottle feeding than about breast feeding, 1.8 times more pictures of bottle than of breast feeding babies, but about equal numbers of positive and negative statements if the same criteria were applied.

ADVERTISING BY HEALTH PROFESSIONALS

Perhaps the most controversial promotional technique involves the actual hiring of health professionals. In discussing its sales practices in Nigeria, Nestle calls these personnel, "'dietetic ambassadors', the Nestle nurses who crisscross the country visiting hospitals, dispensaries, etc. They give advice to mothers on how to take care of their babies and how to correctly feed them" (Nestle, 1970). These so-called "commercial milk nurses" or "mothercraft personnel" are widely used by infant food companies in various parts of the Third World. Wyeth says that, "these personnel are, in most instances, either trained nurses, midwives, nutritionists or medical technicians." The countries in which Wyeth provides such personnel, and their numbers (in parentheses) include: Australia (3), Borneo (2), Egypt (1), Hong Kong (5), Indonesia (4), Japan (11), Malaysia (12), Pakistan (4), Philippines (41), Singapore (7), South Africa (16), Taiwan (14), Thailand (5), and Turkey (8) (American Home Products, 1976b). Bristol Myers probably has somewhat over 110 such personnel in various developing countries.

The activities of "milk nurses" apparently vary with the company and the country. But nearly all include the distribution of free samples. Jelliffe (1975) reports that this is widely done in hospitals in Jamaica, even when the commercial milk nurses are not officially permitted to enter the ward. Carter (1969) attempted to determine how distribution was done at a health center in Barbados in the following interview with a commercial milk nurse after she had distributed supplements:

Q: What type of supplements do you distribute?
A: Lactogen
Q: Are these given as free samples?
A: Yes
Q: What happens after these samples are exhausted; do you give mothers more?
A: I do not know what happens, but I only give each mother once.
Q: How often do you distribute samples at this centre?
A: About three times a month.
Q: How much is given to a mother?
A: One half-pound tin.
Q: How long is that expected to last?
A: I do not know.
Q: Do you give instructions as to the preparation and storage of these foods?
A: No. The health centre nurse does that, but most mothers can read.
Q: Do you have a particular group of mothers to give samples?
A: No. I just pick out any mother and give her; afterwards I take her name and address.

Q: Do you do any follow-ups to see if the supplement is properly prepared?
A: No
Q: Do you do any follow-ups to see that this particular brand is purchased?
A: I cannot answer that--I'll have to get permission from my boss to answer that.
Q: Why then do you take names and addresses?
A: I am not answering any more questions.

Besides visiting hospitals and clinics, milk nurses in some areas obtain lists of new mothers and visit them at home soon after birth (Heywood and Heywood, 1973). The advertisement in Figure 8 provides a telephone number for mothers to call, to reach the Mead Johnson Nursing Service.

American Home Products (1976a) has published specimens of the presentation suggested for mothercraft personnel to use when speaking to new mothers. In teaching mothers about breast feeding, they are told to begin by washing hands and nipples in soapy water and then clear rinse water which has been previously boiled and cooled. They are later told, "You should keep a sterilized nursing bottle handy so that water (or juices when recommended by the doctor or nurse) may be fed between breast feedings. The water should be boiled and kept sealed in the nursing bottles, and warmed slightly before use." The message which comes across clearly to mothers listening to this is that breast feeding requires just as much knowledge, inconvenience, time, expensive equipment and facilities, and fuel as bottle feeding does. Then the same mothers are told the many ways in which S-26 infant formula is "chemically and physically the closest to mother's own breast milk" and that "when full-time bottle feeding is the only choice, I can promise you a baby as happy and healthy with S-26 as he would be if you could nurse him yourself."

What effects do such commercial milk nurses have? In discussing the effectiveness of its 14 nurses in Thailand, Nestle says, "The high birth rates permit a rapid expansion in the domain of infant nutrition; the Nestle products have acquired in 1970 market leadership thanks to their quality, the efforts of the nurses and their contacts with the medical sector in the entire country" (Nestle, 1971). In Jamaica, Grantham-McGregor and Back (1970) reported:

> "Advertising by commercial milk firms was on an even vaster scale than at first anticipated. 14% of the mothers said they were encouraged to bottle feed by a commercial milk nurse. However, many more had been visited at home and given samples of proprietary milk. The hospital itself was used as a centre for easy access to post-partum mothers, and the commercial milk nurses waited outside the postnatal clinics with free milk samples. Many mothers were given up to three different brands of milk samples. The influence of advertising is probably much greater than the 14% indicated."

Figure 8. Advertisement for Mead Johnson Nursing Service

The Mead Johnson Family of Formula Products answers every infant's feeding need.
OLAC
A complete high-protein formula easily digested.
ENFAMIL
A complete and convenient infant formula-nearest to mothers milk in nutritional value.
SOBEE
Milk-free soy formula. A pleasant tasting substitute for infants and children allergic to milk.
POLY-VI-SOL
These vitamin drops are scientifically formulated under the strictest pharmaceutical standards to assure quality and potency. Babies love the delicious fruit-like flavour.
POLY-VI-FLOR
Caries preventative - available in both drops and tablets. Rich in the essential vitamins for healthy growth.
TEMPRA DROPS
Relieves the discomfort due to teething problems, colds, simple headaches and minor aches and pains.
PABLUM RICE CEREAL
This particular variety is specified for use by babies allergic to other grain types. A delightful taste-treat for all infants.
Mead Johnson
Call 73944 for your Mead Johnson Nursing Service.
PABLUM
rice cereal
céréale de riz
SOBEE
ENFAMIL
POWDER
INFANT
FORMULA
Olac

This full-page, full-color advertisement appeared on the inside back cover of the Barbados, West Indies Telephone Directory for 1974-75.

Marketing research in Nigeria (Social Policy Research Ltd., 1973) found that "95% of mothers who combine breast and bottle feeding believed they had been advised to do so by medical personnel, mainly midwives or nurses. Milk company representatives who gave talks on feeding appear to be identified as hospital and clinic staff."

OTHER TYPES OF PROMOTION

Undoubtedly, a crucial part of the many infant food companies' marketing programs is promotion to shopkeepers, providing them with incentives to carry products, to display them prominently, and even to recommend them to mothers. This is accomplished largely through person to person contact. To achieve widespread availability of such products in a given country requires a strong merchandising infrastructure. For example, Nestle (1971) boasted that its products were spread to the most remote villages in Thailand. It kept 1-3 agents per town and 10 trucks and one boat for other regions. Although its products were sold in 200 luxury shops and 10,000 cafeterias, the most important segment of the market was the small shops, 10,000 of which were visited monthly by Nestle "vending forces".

In its centenary film, quoted in the British Broadcasting Company program, "Panorama" of December 1, 1975 (a documentary on bottle feeding in the Third World), Nestle boasts about how it promotes its products in poor countries. "The smallest shop possible; this young woman carrying a few tins of milk for resale in her village. We are very far from the laboratories and the factories. We are in the very back of the beyond."

Other aspects of distribution also involve promotion. Figure 9 shows a delivery truck, Figure 10 a "point of purchase" display, and Figure 11 illustrates how tins themselves can serve as a kind of advertisement, picturing modern mothers, healthy, bouncing babies, respected symbols of health such as a nurse, and touting supposed health benefits of their ingredients.

REMOVING THE CAUSES

Some of the causes of the shift from breast to bottle will be difficult to overcome, especially those which seem to automatically accompany the process of modernization. But there are several causes for which remedial approaches could and should be researched and developed.

Research must continue to see whether the supplementation of the maternal diet, already a desirable program, might also increase breast milk and lead to longer and more adequate breast feeding. Recent studies have continued to be as contradictory as earlier ones with respect to the relationship between maternal diet and breast milk quantity. Whereas Edozien et al. (1976) report that calorie supplementation to a lactating mother can increase the volume of breast milk, Lönnerdal et al. (1976) report that quantity and quality of breast milk appear not to be affected by maternal malnutrition. Studies should be done

Figure 9. A Delivery Truck for Similac Infant Formula (product of Abbott Laboratories)

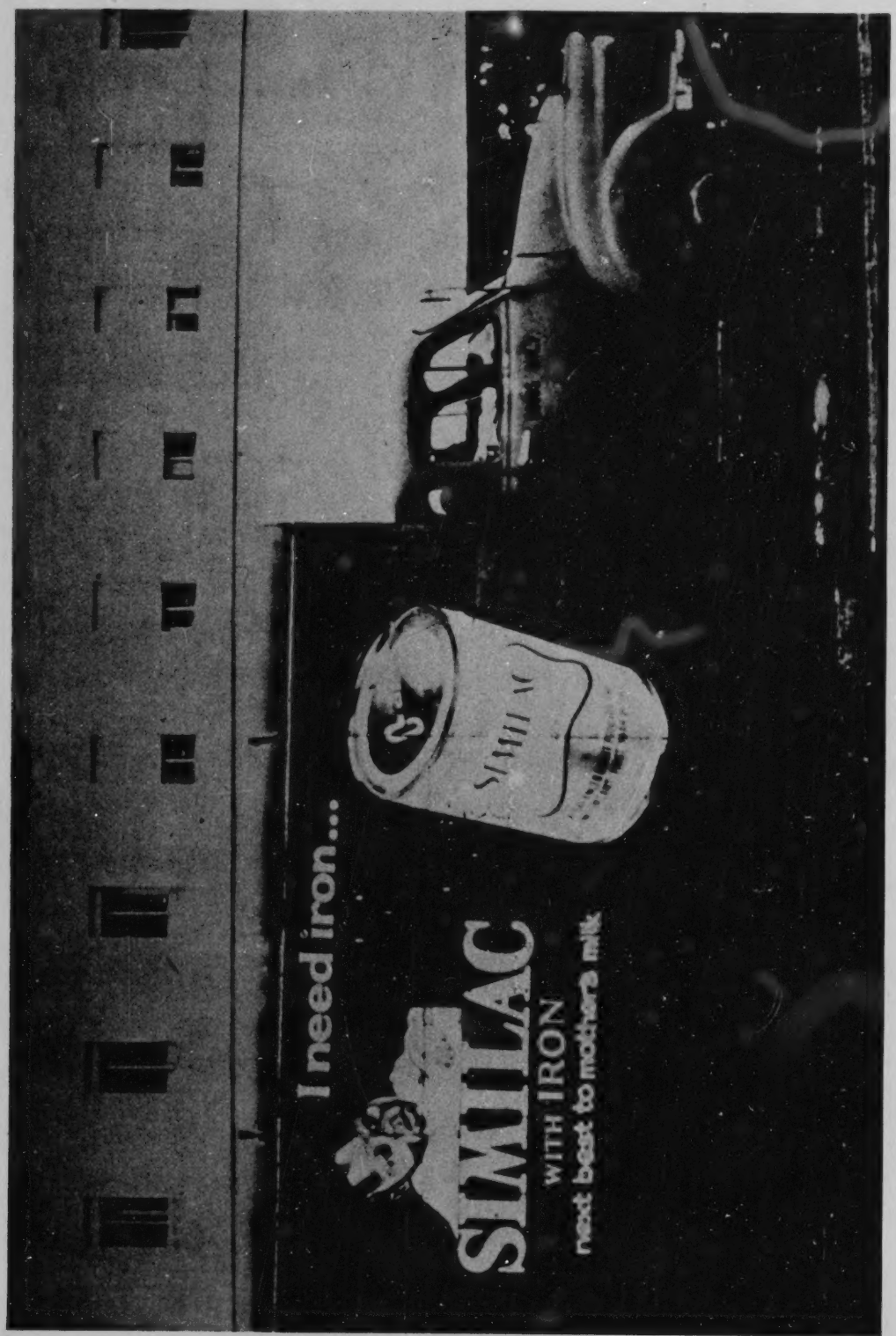
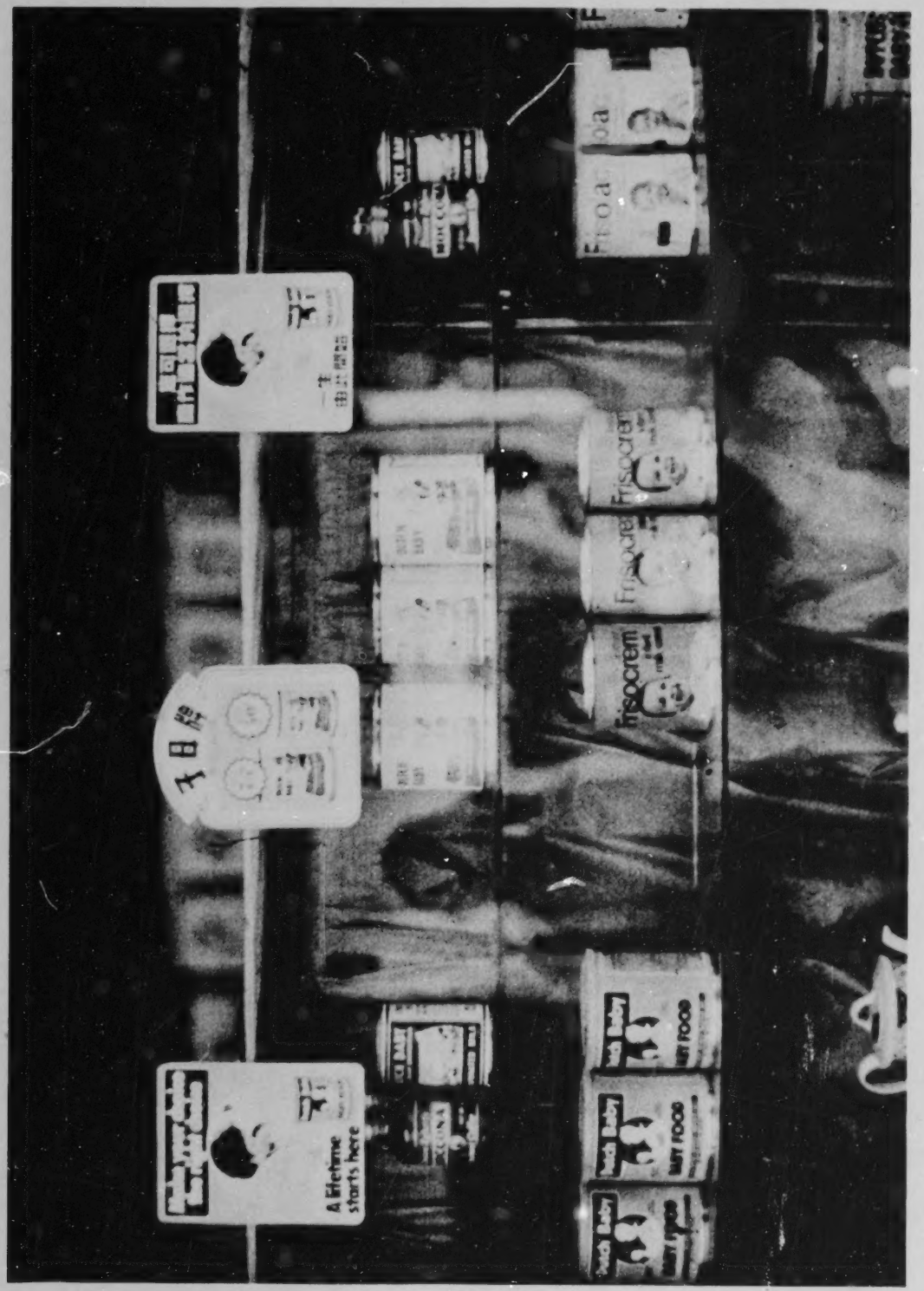


Figure 10. A Point of Purchase Display



This photograph was taken on January 25, 1976 in the town of Malaka in Malaysia. Provided to the author by T. Mahneke.

Figure 11. Tins of Infant Food

The tins were photographed by the author in Kingstown, St. Vincent in July, 1975. The front of the Cow & Gate label consists of a photograph of a young mother and her healthy baby and the statement, "Highest in Protein for Healthy Growth." The Lita tin displays a picture of a nurse, respected symbol of modern health services in developing countries.

also to see whether the provision of monetary or other incentives to mothers who continue to breast feed would be effective.

Although maternity leaves exist in most countries, often for more than 12 weeks (Pechevis, 1975), efforts must be made to increase indemnities to the level of salaries if such legislation is to prove effective. Many countries also require large employers to provide rest periods and nearby day care facilities for breast-feeding mothers, but such laws are often poorly enforced or employers find ways to bypass them. For this reason, Pechevis (1975) recommends working toward more flexible work schedules such as part-time work or piece work.

Of course, the world leader in policy measures to encourage and sustain breast feeding is the Peoples Republic of China (PRC). Creches are provided for all working mothers, and those in the fields as well as in the factories have their work schedules adjusted so as to allow for breast feeding breaks. Social pressure helps contribute to an environment which apparently has lead to extended periods of lactation and overall excellent child health. In Shanghai in 1972, the infant mortality rate was reported to be 8.7 per thousand live births (Wray, 1976).

There is an urgent need to improve the quality of education on infant feeding for health professionals, especially physicians. Dwyer (1975) suggests that monetary incentives should be offered to schools which undertake to meet this need.

In this regard it is encouraging to note that recently published manuals for paraprofessionals in developing countries cover the subject much better than traditional pediatric textbooks. One particularly outstanding manual, Nutrition for Developing Countries, (King et al., 1972) says, "Persuade [mothers] not to buy the expensive infant foods some shopkeepers will try to make them buy." (section 7.14) and, "Bottle feeding is one of the worst things that has come to Africa from Europe and America" (section 8.1). Also, the manual, Child Health (Balldin et al., 1975) says, "Fight advertisements about 'modern feeding'." (section 5.4).

The actions mentioned so far, if effective, would help increase the incidence and duration of breast feeding. However, except possibly for the last one, they might have little effect on the spread of bottle feeding. In Jamaica, where women have been subject to both heavy advertising for commercial infant foods and health professionals who strongly advocate breast feeding, Almroth (1976) found that 36% of mothers thought that breast feeding was the best way to feed young babies, 3% thought that bottle feeding was best, and 60% thought that a combination of breast and bottle was best (N = 173). The most common feeding pattern was exclusive breast feeding for about one month, a combination of breast and bottle feeding from the second through the eighth month, and thereafter bottle feeding only.

The dangers of overdiluted and contaminated bottle feeds, though perhaps somewhat diminished, are still present when breast and bottle are both given. To achieve a more ideal infant feeding pattern, it would be necessary not only to promote breast feeding, but to diminish those forces which encourage bottle feeding, primarily the promotion of commercial infant foods. In fact, much effort has already gone in that direction.

A HISTORY OF EFFORTS TO CURTAIL THE PROMOTION OF COMMERCIAL INFANT FOODS

Efforts to control the promotion of infant foods have originated from several sources: infant food companies themselves, organizations of health professionals, ministries, legislatures, heads of state, and courts of law in both the Third World and in home countries of multinational infant food companies. Various international agencies have been involved, such as those which are part of the United Nations, and pressure has been exerted by various religious, charitable, or public interest groups. Undoubtedly recent interest in the issue among the mass media has led to considerable public pressure (Post, 1976).

Perhaps the first effort to regulate infant food advertising was taken in 1964 when medical consultants of the two Swedish infant food companies, Semper and Findus, met and drew up a policy statement which required that all future infant food advertising done by the two companies would have to conform to certain strict regulations. Among these was the statement that no advertising for breast milk substitutes (starting formulas) was to be directed toward the public (Gyllenswärd et al., 1975).

In the following years, concern was growing among health professionals about the continuing rapid spread of bottle feeding and the possible causational role played by commercial promotional campaigns. This led to a series of meetings between pediatricians and infant food companies sponsored by various United Nations agencies including the Protein-Calorie Advisory Group (PAG). These lasted from 1969 to 1974 and resulted in several publications. PAG Statement Number 23 (PAG, 1972) contained recommendations to infant food companies, to U.N. agencies and governments, and to pediatricians. It made some slight progress toward regulating infant food advertising, recommending among other things that "industry should recognize and emphasize that the immediate postpartum period and the hospital nursery are not appropriate for any promotion of infant foods directed at other than professional personnel."

Although a somewhat more weakly worded revision of Statement 23 came out after the next pediatrician/infant food industry meeting (PAG, 1973), the PAG itself later drafted a Code of Practices for advertising of infant foods, from which the following is extracted (quoted by Morley, Biddulph, and Jelliffe, 1974):

> "No food should be advertised as being a food suitable for or to be given to an infant of three months or less. Local conditions may require national authorities to extend this restriction to six months.

> No claim shall be made in an advertisement implying that any food, including infant formula, is equivalent or superior to mother's milk, nor shall statements be made in advertisements which would, directly or indirectly, encourage a mother not to breast feed her infant.
>
> No advertisement shall state or imply that that product advertised has medical or other professional support.
>
> Advertisements and samples of branded infant foods should not be distributed in or displayed in hospitals or other medical and health centers, for purposes of promotion."

In 1970, the Pan American Health Organization (PAHO) recommended "strong actions...to prevent advertising of commercial milk products on government premises," and various activities of "commercial milk nurses" (PAHO, 1970). In 1974, the World Health Organization (WHO) of the United Nations issued a statement which urged "member countries to review sales promotion activities of baby foods and to introduce appropriate remedial measures, including advertisement codes and legislation where necessary" (WHO, 1974).

Recently the Committee on Nutrition of the American Academy of Pediatrics (1976) expressed its concern, though in rather ambiguous terms: "Physicians, nurses, and other health aides attending pregnant and postpartum women, as well as sales persons promoting formulas, should not unconsciously encourage a negative attitude toward breast-feeding, particularly where its discontinuance may increase the risk of malnutrition."

In 1974, the British charity, War on Want, published a booklet called The Baby Killer (Muller, 1974) which explained the infant food advertising problem to the public. When the Swiss Third World Action Group[2] published a German translation of this with a title that stated "Nestle Kills Babies", the firm sued them in a court of law on four charges. The trial continued until mid-1976 when Nestle withdrew three of the charges and the group was convicted and levied small fines on the fourth, namely that the title was defamatory.[3]

2/ Address: Arbeitsgruppe Dritte Welt, Postfach 1007, CH-3001, Berne, Switzerland.

3/ Technically, according to Swiss law, it is the mothers using Nestle products who kill those babies that may die as a result, a legal analogy to the case of a gun manufacturer who is not responsible for how his product is used. However, the judge said his verdict was not an acquittal of Nestle, and if the firm wanted to avoid the risk in the future of being accused of unethical and immoral advertising, it would have to thoroughly reconsider its promotion practices.

However, public pressure from the publicity generated by the Nestle trial spurred the announcement in November 1975 of the formation of the International Council of Infant Food Industries (ICIFI) by eight infant food companies.[4] They promulgated a "Code of ethics and professional standards for advertising, product information, and advisory services for breast milk substitutes." Unfortunately the code contained few provisions that were not already standard practice for most companies, and made no attempt to regulate advertising practices. It was not approved by the PAG; and Abbott Laboratories, one of the most active participants in the PAG meetings, refused to join, because its own code of ethics was already more strict.

Meanwhile, in the U.K. pressure from ministries forced the curtailment of much of the advertising of British infant food companies. In the U.S. various religious organizations, coordinated by the Interfaith Center on Corporate Responsibility (ICCR) of the National Council of Churches[5] filed shareholder resolutions with the three American-based multinational corporations which market infant formula in the Third World. These resolutions demanded information on relevant marketing practices of each company. With respect to the Bristol Myers Company, 5.4% of shareholder votes were for the resolution, partly because the Ford Foundation voted for it. This, plus pressure from the Rockefeller Foundation, resulted in a report from the company. However, ICCR felt that the report contained many mis-statements, for example that the company does no mass media advertising, sells mostly formulas for sick infants, and does not market its products in the least developed countries. A Catholic order, the Sisters of the Precious Blood, has filed a suit against Bristol Myers which has the potential of making available a vast quantity of information on the company's marketing practices. It is still pending at this time.

Perhaps largely in response to such pressure, the three American companies have published codes of ethics changing somewhat their marketing practices. Abbott ("Code of Marketing Ethics for Developing Countries, With Reference to Infant Feeding") and Bristol Myers ("Policies and Practices: Production, Labeling and Marketing of Infant Formula Products in Countries Outside the U.S.A. (Including Its Possessions) and Canada") have formulated codes of ethics which preclude mass media advertising in developing countries although the use of milk nurses, the distribution of free samples, and other promotional efforts are not to be discontinued.

Recently, concern over the problem has been growing in the U.S. Congress, and on September 13, 1976, Michael Harrington and 27 other members of the House of Representatives submitted Infant Feeding Resolution, H.J. 1095. It calls on the U.S. Agency for International Development (AID) to cooperate with developing countries in devising and

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4/ The eight companies are Dumex, a subsidiary of the East Asiatic Company of Denmark; four Japanese companies: Meiji, Morinaga, Snow and Wakodo; Nestle of Switzerland; Unigate of Great Britain; Wyeth, a subsidiary of American Home Products of the U.S.A.

5/ Address: Room 566, 475 Riverside Drive, New York, New York 10027, Attn: Ms. Leah Margulies.

carrying out strategies designed to promote breast feeding and asks the President to conduct a detailed study into the "nature, scope, and extent of the effects of infant formula use in developing countries." It includes requests for information on advertising and promotional expenses and techniques and "the degree to which these practices contribute to early weaning trends." Also, the General Accounting Office of the U.S. government has begun an investigation of the issue in preparation for hearings before the Senate Select Subcommittee on Nutrition and Human Needs scheduled for early 1977.

In many developed countries groups of concerned citizens have formed to study the issue and plan actions. Some are listed in Appendix 4.

Most important, of course, is the fact that many Third World countries have put a great deal of thought and concern into how best to deal with the problem of commercial infant food promotion within their borders. Legislation regulating infant food promotion has been passed in Nigeria and Jamaica (New Internationalist, 1975). Niger no longer permits milk nurses or any form of infant food advertising in government health facilities (PAN, 1974). The Gambian government "was seriously thinking of introducing legislation to ensure that [feeding] bottles could be obtained only on a doctor's prescription" (Samba, 1974). A breast feeding mothers' organization in Papua New Guinea, Susu Mamas, succeeded in getting radio advertising of infant formulas, teats and bottles banned, and all advertising of canned baby foods submitted to a medical panel. "Legislation totally banning the display or advertising of breast milk substitutes and requiring a doctor's prescription for the purchase of feeding teats, is pending in the National Parliament," (Maack, 1976). The Ministry for Health and Social Services of Guinea Bissau has ordered that: "(1) powdered milk must only be sold in pharmacies and on doctor's prescription; the prescription and name of the doctor must be legible; (2) the same procedure applies to glass feeding bottles, sales of plastic feeding bottles being prohibited because of the problem of sterilization." (Nõ Pintcha, 1976).6/

WHY CURRENT EFFORTS TO CONTROL THE PROMOTION OF INFANT FOODS ARE NOT ENOUGH

The results of these efforts to control the promotion of infant food are impressive, especially since they are the fruit of only a few years of concentrated effort (though backed by many years of hard work by a few dedicated health professionals). However, it should come as no surprise that many infant food companies have so readily agreed to no longer advertise through the mass media in developing countries.

Mass media advertising is the most blatant form of promotion and the one most susceptible to public criticism, a public relations risk

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6/ A further explanation of the Guinea Bissau action is given by D. Lima in an article entitled "'Le Biberon' en Guine Bissau", an English translation of which appeared in International Peace Research Newsletter, Vol. XIV, No. 4, 1976, p. 25-26, published by the International Peace Research Association, P. O. Box 70, 33101 Tampere 10, Finland.

by all accounts. However it is only the tip of the promotional iceberg and complacency over its discontinuation by some companies is totally unjustified, as the following four points make clear.

(1) Nestle, the largest selling infant food company in Third World markets, as well as other European and Japanese infant food companies, have made no commitment to curtail advertising.

(2) Many large infant food companies, especially Dutch and Danish ones, sell to local or regional wholesalers for repackaging in such a way that the actual manufacturer cannot be identified. These and other local infant food companies have received little attention or pressure to change their advertising practices.

(3) Mass media advertising is only one part of a much larger promotional program as detailed earlier. The money previously spent on advertising may simply be spent on these other methods of promotion. Just as stopping the advertising of cigarettes on American radio and TV has failed to solve the problem of smoking in America, curtailing infant food advertising will not, in itself, lead to a rapid change in infant feeding trends. The following are examples of other types of promotion which might continue unabated or at heightened levels:

a. Free samples can be particularly effective promotional devices. It would be hard for a mother to resist using one even if promotion had not endowed it with high status in her eyes and even if she were not poor. Unfortunately, once the free sample runs out, the mother may find that her own breast milk, hormonally regulated in quantity to meet her infant's demand for it, is no longer adequate.

b. Infant food companies would probably not hire mothercraft personnel if they failed to increase sales. In most developing countries this increase is not coming from the few wealthier mothers, who would probably bottle feed anyway. Infant food companies say that their milk nurses provide important basic health care which hard-pressed local health professionals cannot attend to. Ironically, part of this work load is due to the products which the mothercraft personnel are promoting. And part of the reason for the shortage of health professionals is the fact that they can earn more by working for an infant food company. Muller (1976b) tells of a charity antenatal clinic in Malaysia he recently visited which "had three company nurses giving out samples and leaflets about free gift offers while two nurses ran the clinic."

c. Attractive infant care and feeding literature produced by infant food companies will continue to perform the function for which it is designed: to increase sales.

d. Product displays, product labels, and even just widespread availability can act as forms of promotion--a constant enticement to at least try it. And it should be emphasized that just trying the formula for awhile (or innocently using up a free sample) can lead to less successful lactation because, first of all, the infant

may prefer the taste of the formula, usually sweeter than that of breast milk; second, the infant may prefer the bottle since it requires less sucking effort than the breast; and third, as mentioned previously, when the infant gets part of its food elsewhere, the reduced sucking stimulation of the mother's nipples leads to reduced milk output.

In St. Vincent, where the median age of introduction of milk by bottle was 2 weeks, the most commonly given reason for the cessation of breast feeding was "the baby weaned itself" (Greiner, 1977). Even more important, although the dangers of overdiluted and contaminated bottle feeds may be somewhat less for a baby also receiving breast milk, they still exist. Studies tend to show a decline of nutritional and health status in babies who were put on the bottle, even if they were also breast fed (Plank and Milanesi, 1973; Almroth, 1976).

e. If health professionals and storekeepers can be convinced of the "value" of commercial infant foods, they can be much more effective at convincing mothers than mass media advertising can. Health professionals can also be used unwittingly through the processes of "endorsement by association" described earlier. Because of past assistance received from infant food companies, many health professionals may avoid pressing the companies to change and may even come to their defense (see Cagas, 1972).

(4) The longer advertising has been going on, the more difficult it will be to overcome its effects. When a mother or grandmother tells a young mother how to feed her baby, it has the force of tradition, even if it is based on the advertising of an earlier decade.

SUGGESTED FURTHER MEASURES TO CONTROL THE PROMOTION OF INFANT FOODS

(1) Efforts should continue at all levels to influence the large multinationals to stop advertising infant foods in the Third World.

(2) Even if these efforts are successful, the result may be only a shift in the share of the market to regional firms and companies who sell to them, unless Third World countries themselves ban infant food advertising within their borders.

(3) a. Free samples. It is difficult to justify the continuation of the practice of handing out free samples, given their purpose. If a mother is poor enough to need a free sample, she is too poor to use it properly, and the promotional impact of that sample on her and her friends is unjustifiable. Many countries might find it beneficial in the long run to ban free samples.

b. Commercial milk nurses. Research should be done to see whether such personnel exert an overall positive or negative effect in a community. But, given their likely long term negative impact on infant feeding practices, many countries might consider banning them.

c. Infant care and feeding literature should be produced with the help of local or regional health professionals according to local needs. Practices leading to an ideal infant feeding pattern should be promoted and the purchase of commercial infant foods should be discouraged. Infant care and feeding literature produced by infant food companies should not be disseminated.

d. Morley (1973) cites a label used by a national milk company in Africa: "Breast Feed Your Child. The best food for your child is the mother's milk. It is better than this or any other kind of artificial food. Don't feed your child artificially unless you are sure that you have the money to buy enough milk. By the time that your child is four months old, he will want five pounds of milk powder each month. Are you sure that you have enough money to buy this? Feed your child with a cup and a spoon, and not with a feeding bottle. Ask in the shop where you bought this item for a paper telling you how to feed your child." Labels could be even more explicit about the local costs and dangers of using the contents and the advantages of mother's milk.

e. Any attempt to control the availability of infant foods will run into a great number of problems. Governments have several means available, such as import restrictions, price controls, and placing items on a prescription-only basis. Any such moves should be taken only with careful consultation with appropriate parties concerned with the economic, social, legal, and nutritional implications. Prices, in particular, bear close scrutiny. Low prices may tend to lead toward more widespread adaption of bottle feeding, but high prices will put pressure on those mothers who do use it, possibly causing them to further overdilute it.

Restricting availability also would not insure that mothers would then turn to an ideal infant feeding pattern. They might instead substitute other less desirable forms of milk and weaning foods of inadequate protein and calorie density.7/ If bottles were restricted in availability, mothers might also turn to less suitable methods of delivery. A nipple on a soda bottle may be used and this type of bottle is extremely difficult to keep clean.

Requiring prescriptions could be tried, but might add too great an additional burden on doctors. Furthermore, placing infant formula on a prescription-only basis could give even greater impetus to the idea that it acts like a drug. This may contribute to the apparent belief that if a "standard dosage" of the milk powder is very good, a "homeopathic dosage" of it should do at least some good.

7/ Of course, this is already a serious problem in many areas. The Indonesian government has taken a step in dealing with one aspect of the problem by requiring all midwives beginning in 1961 to tell mothers that sweetened condensed milk was not to be used for infants to replace mothers' milk. Manufacturers had been asked to remove infant feeding schedules from the tins and in December 1975 they were asked to label them "not suitable for infants". Interestingly, producers were already complaining by February 1976 of a decline in sales because of the regulations (Antara National News Agency, 1976).

(4) One approach, non-commercial marketing, could solve many of the problems mentioned above. It is somewhat analogous to the approach recommended by Lall (1975) in dealing with the problems of brand name drugs and the pharmaceutical industry in the Third World. He says, "The first step in formulating a national drug policy is for every country to draw up a list of drugs which are essential to the well-being of the majority of its population...In order to provide such a supply of basic drugs, in their most economical form to the public, it is clear that the marketing system must be changed drastically." Similarly, once a developing country made a decision on what types of infant foods were really needed, the approximate amounts required could be estimated, the least expensive source of bulk import (or local manufacture) could be sought, and the products could be packaged locally (or abroad to specific requirements) in an appropriate form with appropriate labels. These products could then be made available in some controlled fashion.

This approach, eliminating many of the marketing functions now in the sole purvey of large multinational pharmaceutical and/or food companies, could remove the vast majority of the commercial image, and eventually the unwarranted status of infant foods. Economically, it would be advantageous at both the family and national levels.

(5) The problems with restricting availability and the problem of the cumulative effects of past advertising could be overcome only by education. In fact, without appropriate education of the public there is little hope for reversing the trend from breast to bottle.

It was because of a strong belief in the central role that education must play in such a process, coupled with a feeling that a short term, mass media based campaign would not be sufficient to accomplish the task, that the author undertook a review of the literature on theories and research in communication.

Although a great deal of work in the area has been published, two issues of concern emerged which seem of central importance and relevance, yet seem also to be largely neglected or misunderstood in most efforts at nutrition education. The first involves a comparison of the relative advantages and disadvantages of mass media versus interpersonal contact as channels for communication. The second includes several aspects of research on the diffusion of innovations. These two questions are dealt with in the following sections, first in a more general context, and then with respect to their implications for efforts to overcome the effects of past and ongoing promotion of commercial infant foods and to promote an ideal infant feeding pattern.

THE VALUE OF MASS MEDIA

The mass media possess a vast potential for use in nutrition education, including attempts to influence infant feeding practices. It would seem sensible to begin thinking of the mass media in the same way as a natural resource--to be used, at least in part for the public good. Manoff (1973) suggests reserving 10 percent of all air time for public use, particularly for nutrition education. He says that broadcast time is a non-capital asset that could be used essentially as a subsidy for nutritious foods.

Research on the effects of mass media has led to conflicting opinions on exactly what impact they can be expected to "deliver" in a campaign. On the one hand, Manoff (1973) claims, "assuming appropriate messages, the mass media can reach out to all the target audience on a preventive basis, with nutrition education and motivation in a continuing program, limited in its content, but total in its impact."

Representing a differing viewpoint, Douglass (1972) is critical of some communication scholars, claiming that "in a style somewhat reminiscent of Vance Packard (1957), they assert that the mass media are exceedingly powerful tools to mold societies and men...to persuade traditional people to become modern, and to do it quickly." He refers to the work of Klapper (1960) who argued that, while mass media can increase knowledge and understanding, they have not been proven to have much effect on strongly held attitudes or on behavior. He hypothesized that everyone has various internal mechanisms which restrict information to that which is compatible with an individual's present beliefs. Douglass says that Weiss (1970), in a review of studies up to 1968, found no significant evidence that would alter Klapper's finding that the mass media, used as the sole instrument of behavior change, are relatively ineffective.

Such a viewpoint would seem to be supported with respect to nutrition education by the results of an experiment carried out in India (Parlato, 1974). Researchers spent eight months compiling nutritional, sociological and economic data on eight rural and small-town areas. Of this target population of 250,000, a sample of 1500 was interviewed regarding their food habits and communication patterns. This information was used to determine the elements of message, target groups, theme and media. The messages chosen involved the use of greens in maternal diets and the introduction of solids for six-month-old infants. Separate samples of 2500 people were interviewed before and after an intensive ten-week, 13-media campaign, to ascertain beliefs and attitudes towards the subject matter. Dramatic increases in knowledge and understanding occurred. But "a gap existed between people's understanding and their attitude towards new ideas: they understood the concept but simply did not accept it." The apparent conclusion is that it is risky to attempt to change deeply ingrained behavior such as food habits solely through the use of a mass media campaign, especially one of relatively short duration.

However, this does not imply agreement with those who suggest the mass media are impotent. Chaffee's position (1972) seems to be more tenable:

> This "media impotence" hypothesis is, of course, hard to accept at face value. The advertising and public relations industries are apparently built on the assumption that the media have strong persuasive capabilities, and there is a vast research literature to support their faith (as well as an undoubted mass of unpublished studies in secret files of advertising

> agencies). But as a comparative statement, most writers seem to agree with Rogers (1969) that "mass media are able to create a generally favorable mental set toward change but are seldom able to change specific attitudes toward new ideas, a task better accomplished by interpersonal communication channels."

A study of the effects of modernization in the Philippines (Guthrie, 1969) serves to illustrate how these theoretical distinctions may operate with respect to nutrition education. Guthrie examined practices of and beliefs about infant feeding in four villages at varying distances from Manila. The closer they were to Manila, the more they showed such influences of modernization as industrial growth, expanded educational opportunities, and increased exposure to mass media. While very few influences of modernization manifested as changes in traditional food beliefs and superstitions, mothers in the more modernized villages had more favorable attitudes toward newer methods of health care in general. In Rogers' terms, modernization, or at least the media exposure component of it, appeared to be capable of creating a generally favorable mental set toward new ideas (i.e. modern methods of health care), but were unable to change specific attitudes (i.e. traditional food beliefs and superstitions).

The mass media also appear to be effective in realms of superficial social change. They can be used to shift brand loyalties or introduce new product fads. Advertisers commonly attempt to maximize their "reach" (audience reached by a particular medium) and "frequency" (exposing each person to the same message repeatedly). Schramm (1964: 137) suggests that this can help form people's tastes because they learn to like what they see and hear often.

Furthermore, there is empirical evidence (Lemert, 1966) to support the hypothesis that the media confer status on an individual "beyond the level that would be intrinsically merited" (Chaffee, 1972). Weiss (1970) shows that the same phenomenon extends to ideas and objects. Schramm (1964: 135) suggests that this effect might be even more powerful in developing countries where media are more scarce. Pierce (1971), in a study of foreign students studying in the U.S., found "a strong correlation between foreign students' levels of favorability toward American advertising and the stage of economic development in the students' home countries. The relationship was inverse: the higher the stage of economic development, the lower the level of favorability."

TYPES OF MASS MEDIA

Many forms of mass communication have been developed. "First generation" media often involve some form of face-to-face communication, though it may be on a formal basis and of course does not involve one-to-one contact. These include charts, chalkboards, models, demonstrations, and dramatizations, and are generally the most widely available form of mass media in developing countries. Second generation media include various forms of printed matter; third generation are the many audio and/or visual media, including relay technologies such as satellites;

and fourth generation media include programmed teaching materials or those involving computers or laboratories (Schramm, 1964: 141).

In deciding which type of mass media to use, Douglass (1972) suggests that communicators spend their time researching and crafting the nutrition message rather than developing and maintaining complex communication facilities. Balcomb (1972) urges that "hardware" be brought in only if plans show that it will be cost-beneficial. He suggests, for example, that a good nutrition-based story could be adapted for use in a puppet show if television were unavailable.

Unfortunately, it may be easier to obtain funding and to generate favorable public relations by utilizing the most recent technological advances. And many communication "experts" actually are experts with respect to one particular type of media, and their efforts all too often follow Kaplan's "law of the instrument" (1964: 28): "Give a small boy a hammer and he will find that everything he encounters needs pounding. It comes as no surprise to discover that a scientist formulates problems in a way which requires for their solution just those techniques in which he himself is especially skilled."

In any case, many communication programs carried out in developing countries seem to place more attention on the medium than on the message. There may be nothing wrong with utilizing technological tools per se, but as Pye (1963) points out, development is less dependent on investment in a modernized communication system than on adjusting the informal rural systems to each other and to the existing mass media systems. Furthermore, any educational campaign that relied heavily on less technology-intensive forms of mass media would make greater use of the one readily available resource in most developing countries--labor.

In some ways, of course, the distinction between mass media and interpersonal channels of communication is artificial. The mass media are inseparable from the interpersonal in their functioning. Most mass media are consumed in a social context rich in interpersonal contact (Chaffee, 1972). This is particularly true in developing countries, where group consumption even of print media such as newspapers is common. As mass media become more widespread, they gain the power of introducing topics of conversation simultaneously to a huge audience. In fact, in political campaigns, for example, the mass media may have a virtual "agenda-setting" function (McCombs, 1972).

THE VALUE OF INTERPERSONAL COMMUNICATION

Table 1 compares interpersonal and mass media channels with respect to seven communication characteristics. It shows that although the mass media have the advantage of being able to transmit a message rapidly to a large audience and to do it accurately, the message can be more carefully controlled using interpersonal communication channels. Interpersonal channels provide an opportunity to aim the most appropriate message to each audience in the most convincing way. In such face-to-face communication it is much easier to get feedback, to find out how a message is being perceived and to alter it, correcting any possible sources of

misunderstanding. This is probably the only form of communication capable of overcoming what are called "selectivity processes" and other forms of resistance to a message. We each have our own frame of reference, our own way of perceiving reality, including biases, prejudices, and "blind spots" to messages we do not want to hear. As mentioned above (Klapper, 1960; Weiss, 1970), some research suggests that people have a powerful ability to either ignore or alter the meaning of messages communicated to them through the mass media. A face-to-face discussion can overcome these defenses or blocks, especially to the extent that it approaches true dialogue, that is, with both parties participating as equals.

Table 1

Comparison of the Communication Characteristics of Interpersonal and Mass Media Channels

Communication characteristics	Interpersonal channels	Mass media channels
Direction of message flow	two way	one way
Speed to a large audience	slow	rapid
Message accuracy to a large audience	low	high
Ability to select receiver	high	low
Ability to overcome receiver's selectivity processes	high	low
Amount of feedback	high	low
Possible effect	attitude change	knowledge increase

Source: Rogers (1969: 125)

Table 1 implies that mass media are more accurate than interpersonal channels of communication. This is referring to the well-known phenomenon that a message traveling by word of mouth tends to get distorted. Thus mass media can perform an important service in helping to keep down rumors. But in some ways, at least in developing countries, mass media may be less accurate in their actual effect. Fuglesang (1973) has designed a number of experiments which demonstrate convincingly that many persons in developing countries, especially those who are illiterate, perceive things in totally different ways. He backs this up with anecdotal examples of mass media messages which were misinterpreted or simply not understood.

Table 1 also shows that interpersonal channels are able to affect an audience at a deeper level, that is to change attitudes rather than merely adding to knowledge or awareness.

TYPES OF INTERPERSONAL COMMUNICATION CHANNELS

Making use of interpersonal channels of communication may call for a rather complex campaign strategy. For, the people who personally

convey an infant feeding message, will themselves form separate target groups requiring different communication strategies. Perhaps a model such as the one in Figure 12 could help in choosing the media and the approach best suited to each target audience.

In order to achieve a common nation-wide experience that, properly nourished, is capable of conveying a sense that something of significance is happening, as Berg (1973: 82) puts it, none of these target audiences can be neglected. And although the advantages of a "top-down" approach (starting with the highest officials) are obvious, simultaneous "bottom-up" pressures can also be most effective.

In general, the most efficient approach would utilize cells in the diagram in Figure 12 which progress from the upper left corner diagonally to the lower right corner. That is, government officials, whose sanctions or funding approval were crucial, could be approached most effectively on an individual basis, while it would be inefficient to expend personal effort, perhaps even at the small group level, on the general public (that is, the segment of the general public apart from the target groups).

It might also be necessary to enlist the support of key doctors, hospital administrators and other health professionals on an individual basis. Other health professionals might be contacted in relatively small groups from professional meetings to local in-service training sessions. This could include nurses, midwives, public health workers and paraprofessionals such as community health aides. The journal of the Caribbean Food and Nutrition Institute (CFNI), Cajanus, has carried articles on utilizing for nutrition education such interpersonal channels as midwives (Jelliffe and Jelliffe, 1975), public health inspectors (CFNI, 1968), and volunteers from the community (Antrobus, 1975).

Other professionals who could be contacted similarly might include school administrators and teachers as well as those in guidance and counselling, and social workers and other welfare field workers. Church pastors might have to be contacted more on an individual basis. Special effort in communicating with home economics and family living teachers would seem warranted.

Other elite groups whose support and cooperation might be important to the success of the campaign could be contacted at appropriate levels. Civic, business, social, volunteer, church, and parent-teacher group meetings could provide opportunities for valuable small group contact. Shopkeepers might represent a particularly important group.

DEVELOPING THE POTENTIAL OF INTERPERSONAL COMMUNICATION

One of the main disadvantages of interpersonal communication in developed countries is that it is "labor-intensive" and thus relatively expensive. Thus, it is often passed over by communication specialists trained in industrialized countries. But of course in most developing countries there are large reserves of manpower which can be drawn upon cheaply. And from a communication perspective it is particularly

beneficial to hire local people to act as field workers. Research has shown that people tend to talk more with those whom they perceive as more similar to themselves, to turn to them more for their opinions, and to trust them more (Rogers, 1969). This principle, referred to as "homophily", is particularly important in helping to bring the factor of feedback into play. Without it, as commonly happens in a lecture situation, interpersonal communication loses many of its advantages over the mass media.

Fuglesang (1973) extends these ideas further when he observes that a field worker should not be trained to perceive himself as "somebody who is supposed to communicate with and influence a number of individuals to like a defined and desirable type of action." This results in a preaching approach to communication. It follows the model:

He argues:

> All this one-way thinking is simply a little embarrassing. There is no humaneness in it. Besides, it puts the professional in the village in a very awkward position, though he is usually not aware of it. He is led to believe that he is something more than the villager. He is educated. He is a specialist...[But in the village] the "expert" is worth nothing until he can prove his worth on a purely human basis. This involves two-way communication. It involves participation. It is, therefore, more important that people in the field are good listeners than that they are good talkers...Communication cannot succeed unless there is a sincere feeling of equality in the system. This is a premise which cannot be repeated often enough.

Fuglesang thus suggests that a more appropriate communication model would be:

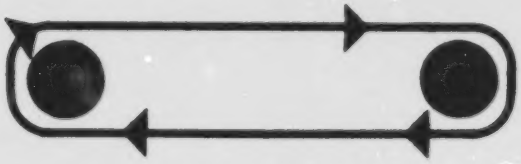

Figure 12. Model for Use in Developing a Plan of Action for the Interpersonal Component of an Infant Feeding Educational Campaign

	GOVERNMENT OFFICIALS AND MINISTRIES	HEALTH PROFESSIONALS	OTHER PROFESSIONALS	ELITE GROUPS	MASS TARGET GROUPS	GENERAL PUBLIC
INDIVIDUAL CONTACT						
SMALL GROUP CONTACT						
LARGE GROUP OR MASS AUDIENCE CONTACT						

So Fuglesang sees the main task of the field worker as that of integrating himself into the internal communication system. One of the best ways to do this is to identify and work through the appropriate opinion leaders, that is, those whose opinions are sought by others in the community (usually not the elites or wealthy persons). But this approach can be dangerous because if the field worker allies himself with the wrong people, he can "accentuate the latent opposition in the community". Also, opinion leaders are often difficult to identify. First of all, different persons may function as opinion leaders in different aspects of village life. A second difficulty, for Westerners at least, is that authority in a village most often derives from personality and performance factors. (Whereas in an industrial society, an occupational title tends to confer an automatic level of authority.)

To truly integrate rather than intrude, the field worker must advance from "awareness to closeness". This can occur only if he gains a knowledge of local customs and beliefs through his reading and listening, if he understands something about group dynamics, and if he is sensitized to the feelings and needs of his recipients. Most important, he must understand that "a true communication professional does not express anything. He helps people to express themselves." He helps them "to become conscious of their potential as creative beings, to make them see that they can control their environment and themselves in a better way" (Fuglesang, 1973).

Fuglesang's philosophy of communication harmonizes with Freire's concept of a humanizing education, one that involves cultural synthesis rather than cultural invasion: "In cultural synthesis, the actors who come from 'another world' to the world of the people do not do so as invaders. They do not come to teach or to transmit or to give anything, but rather to learn, with the people about the people's world" (Freire, 1970: 181). One critical problem in many cultures is fatalism, the belief that supernatural forces alone are responsible for life's problems. This outlook is "the fruit of an historic and sociological situation, not an essential characteristic of a people's behavior" (Freire, 1970: 48). "If man is incapable of changing reality, he adjusts himself instead...it is symptomatic of his dehumanization" (Freire, 1973: 4). A humanizing education involves dialog between the people and the educator to awaken in all a critical awareness of the people's problems and of whatever power and resources they can bring to bear in solving those problems themselves.

Nutrition education has a unique potential to show people that an improvement in the quality of life need not depend on supernatural whim nor on far-off nebulous government officials. Drummond (1975) has pioneered a method of exploring this potential, drawing on the philosophies of both Fuglesang and Freire. She suggests that if nutrition education could become a part of the humanizing process, "not only would the process be helped along, but the nutrition education itself will be more effective, bringing about deeper and more real changes in the food habits of the people."

Drummond studied four impoverished villages in northeast Brazil, learning from "long listening" and informal questioning about their nutrition problems. She found breast feeding to be extensively practiced, bottle feeding rare, and weaning foods, of low protein content. Thus she chose as one main message, the addition of fish to weaning foods.

She prepared posters to be used in community discussions, utilizing Fuglesang's method of "blocking-out" the subject of a photograph, that is eliminating the background for clarity. In one community meeting she used the posters in helping the people identify the problem of young child malnutrition. In the next she used them to facilitate discussions leading to the conclusion, novel for the villagers, that malnutrition was a community concern rather than just an individual family matter.

She then encouraged the people to use her expertise to formulate a long-term community action plan to deal with the problem. Each village was divided into ten-house areas, in a plan similar to Solon's (1972). In each area an elected coordinator was responsible for gathering and monitoring data on the nutritional status of the children in their homes. Mothers of children who were faltering in weight were to be helped and encouraged to improve their children's diets. The coordinators were to meet periodically after the nutritionist left to discuss problems and remind each other of the things they had learned from her.

Although Drummond was unable to do a long term evaluation of her project, two avenues of communication research suggest that such a method should be effective. First, attitude changes are known to be greater when recipients actively participate in the educational process, particularly when public commitments are made (Rachman, 1970). Second, local sources of information are much more credible to people in traditional cultures. Credibility becomes increasingly important as a person progresses from awareness of an innovation to its adoption or rejection (Rogers, 1969).

Drummond was keenly aware of the limitations imposed on her efforts by the lack of a supporting team of experts in related fields, and by the unfortunate political and economic circumstances under which the people had to live. The former appears to be a common problem. Berg and Muscat (1973) note, in a paper on nutrition program planning, that most projects have been adopted because someone had an idea. That idea necessarily reflected and was limited by that person's background and abilities. The same is true to a large extent for individual agencies which pursue isolated programs. Part of this problem can be solved by planning into a project the ongoing involvement and cooperation of a team of nutritionists, agriculturalists, economists, and educators (McNaughton and Davey, 1975). The communication component should include persons who know the popular culture and psychology, media experts to counsel on technical aspects, and artists, script writers and the like to produce materials (Balcomb, 1972).

Communication with government officials, politicians and other decision-makers is a prerequisite for mass communication to the population at large. Crawford (1974) stresses the additional need for a "conscious program of communication within the structure of the government in lining up the needed support and informing and enlisting all who need to know and be involved..." Lack of either understanding or coordination among ministries can kill a program.

While communication with those at the "top" is clearly indispensable Fuglesang (1974) advises channeling communication informally to various field workers. Many public health and community development workers, as well as teachers, are often in need of new approaches for communicating with their client audiences. Church and volunteer personnel can also help to get action going. But the main idea behind such efforts is to create upward pressure on government officials to take more formal actions, in fact, to make it politically easier for them to do so.

Finally, numerous studies underscore the necessity of involving representative members of the target population itself in the planning as well as the implementation of any program of change. Spicer (1952) presents, from an anthropological viewpoint, several case histories of programs which failed because they did not follow such a policy. Particularly effective would be an infrastructure of local coordinating committees (Fuglesang, 1974). One example is the pilot system of organizing the community for nutrition education utilized by Drummond (1975) above which has been successfully initiated also in eight villages in Cebu, Philippines (Solon, 1972).

THE DIFFUSION OF INNOVATION

A second area of relevant communication research centers on the question of how new ideas spread, that is, the diffusion of innovations. Tannon and Rogers (1975) define innovation as "an idea, practice, or object perceived as new by an individual." The important thing is its newness for that person. This may not be just in terms of knowledge of its existence, but can include initial availability, the first time someone has tried to persuade the individual to use it, or the first time the individual has to make a decision to adopt or reject the innovation.

Probably the most widely acknowledged expert on the diffusion of innovation is E. M. Rogers. In 1962, he reviewed 1500 research publications on the topic (Rogers, 1962). He continued to compile widely scattered research reports on the topic, as the literature expanded to 2500 publications during the next decade (Tannon and Rogers, 1975).

Summarized below are relevant points from a recent article by Tannon and Rogers (1975) which discusses four key elements central to the investigation of diffusion of innovation: the innovation, the time dimension, the communication channel, and social systems.

I. Innovation

Researchers have studied many attributes of innovation and have found five which potential adopters most often consider: (1) Relative advantage, the degree to which an innovation is better than its predecessor; (2) Compatibility, the degree to which an innovation is consistent with a person's values and past experiences; (3) Complexity, the degree to which an innovation is difficult to understand and use; (4) Trialability, the degree to which an innovation can be experimented with on a limited basis; and (5) Observability, the degree to which the results of an innovation are visible to others. Research indicates also that these are the most important qualities of innovations with respect to the rate at which they are adopted.

II. The Time Dimension

The time dimension relates to diffusion of innovation in three ways:

(1) Individuals go through similar stages in the innovation-decision process. Rogers (1969: 128) initially suggested that individuals progress through the following stages: awareness of an innovation, interest in it (usually indicated by information seeking), persuasion (attitude formation and change), trial, and decision to adopt or reject. However, he later proposed a revised progression of stages (Tannon and Rogers, 1975) as follows: knowledge, persuasion, decision, and confirmation (seeking reinforcement for the decision made). This final step is in recognition of the fact that contradictory messages can lead to discontinuances, that is, rejection of a recently adopted innovation, in some cases. Rogers and Shoemaker (1971) note that this latter set of stages has close conceptual linkages with psychological notions of decision making, the learning process, and the theory of cognitive dissonance.

(2) Individuals can be placed in adopter categories based on their innovativeness with respect to a particular innovation. Innovativeness is defined as an individual's "earliness in adopting new ideas relative to the other members of a social system" (Tannon and Rogers, 1975). Adopters are categorized as innovators, early adopters, early majority, later majority, and laggards. Research shows that members of each category tend to have many attributes in common. For example, an individual classified as late majority tends to be "below average in social status, has little use of mass media channels, and receives most of his new ideas from peers via interpersonal channels." Little research has been done to show whether a classification for one innovation will hold for others.

(3) The rate of adoption of an innovation is defined as the "relative speed with which it is adopted by members of a social system" (Tannon and Rogers, 1975). This rate is different for each innovation, but usually follows an "S" curve, that is, it starts slowly at first, then catches on rapidly, and finally levels off again.

III. Communication Channels

Research in this area has focused on the receiver's stage in the innovation-decision process. Interpersonal channels of communication appear to be of prime importance at every stage, but receivers identify mass media as a source of influence only at the awareness or knowledge stage (Rogers, 1969: 129). But such findings should not be taken as evidence that the mass media have no effect on the later stages in the innovation-decision process, because they may operate indirectly, for example when mediated through opinion leaders.

IV. Members of a Social System

A social system is a "group of individuals, or units, who are functionally differentiated and engaged in collective problem solving with respect to a common goal" (Tannon and Rogers, 1975). It forms a boundary within which innovations diffuse. For example, the diffusion of new drugs can be studied within the medical profession as a social system, or only among the doctors within a given town.

For three decades, researchers have consistently found that within any social system there are opinion leaders who are able to influence others' attitudes and behaviors. Opinion leaders can do this in ways they desire, and they are able to do it often. They are usually members of the same social system and operate informally rather than through any formal position or status.

A change agent, on the other hand, is a professional representing an external change agency. He need not himself be an opinion leader, but he will usually attempt to work through opinion leaders, in essence using them to "prime the pump". However, when opinion leaders are used too often in this way by change agents, they come to be perceived as too much like the change agent and lose credibility.

Tannon and Rogers (1975) identify three possible relationships between social systems and innovation decisions. First is the optional decision, made by an individual regardless of the rest of the social system. But such decisions still may be influenced by social pressures. Choices of brands of radios, soap, or canned peaches are influenced weakly by social pressures, whereas other choices such as style of clothes may be strongly influenced (Scheuing, 1974: 247). Second is the collective decision involving some form of consensus among the individuals in a social system. Once a decision to adopt or reject is made, all individuals in the system are expected to conform. A community vote on water fluoridation is an example. Third is the authority decision, forced on an individual by a superior. Although this is common in a highly organized society such as the United States (for example in a business), it has received little research attention.

Diffusion of innovations appears to progress more rapidly through a social system when adoption is made by individual decision than by collective decision. Authority decision can lead to the highest rates of adoption if the authority has a positive attitude toward the innovation.

However, authority decisions can suffer from a high rate of discontinuance. An example of the "low quality" of many authority decisions is the school where the principal orders his traditional teachers to make more use of audio visual equipment. The resultant grudgingly made efforts may be poorly integrated into the curriculum and have little learning value.

Much research on the diffusion of innovations attempts to identify ways of increasing the effectiveness of change agents. In general, research indicates that more effective change agents tend to be more empathetic, that is, able to "put themselves in their clients' shoes," and are more client-oriented than innovation-oriented. Rogers and Shoemaker (1971) were able to find 10 long-term innovation diffusion studies that deal with this issue. All 10 concluded that change agents' successes were positively related to the degree to which their programs were compatible with needs the clients themselves felt.

Change agents are best able to influence those whose social class, values, and education are similar to their own. The more traditional a culture is, the less likely it is that the people will seek information from those of higher status (Rogers, 1969).

Change agents greatly extend their effectiveness by identifying opinion leaders and concentrating efforts on them. But they should not assume that those members of a social system who are the first to adopt an innovation are opinion leaders. In fact, these "innovators" are often viewed as deviants and have low credibility among the majority of their peers (Rogers and Shoemaker, 1971). However, those who wait a little longer, classified as "early adopters", tend to be opinion leaders (Tannon and Rogers, 1975). Rogers and Shoemaker (1971), in reviewing an extensive body of literature, conclude that in most cases early adopters tend to (1) rate higher on measures of socio-economic status, (2) have personalities which include more empathy with others, greater intelligence, and more favorable attitudes toward science and toward change and risk, and (3) have greater contact with both mass media and interpersonal channels of communication.

Rogers and Shoemaker (1971: 164) use the term "overadoption" to refer to "the adoption of an innovation by an individual when experts feel he should reject". They observe that very little research has been done on it, perhaps "because of the greater usefulness of under-adoption studies to the research sponsors". In other words, financial or political rewards lie in educating people to accept "desirable" innovations, not in educating them to reject "undesirable" innovations.

When "overadoption" occurs, it has been found to be due to (1) insufficient knowledge about the new idea on the part of the adopter, (2) inability to predict its consequences, (3) a mania for the new, or (4) seeing the innovation as a panacea (Rogers and Shoemaker, 1971). Francis (1960) surveyed 88 adopters of grass incubators, an innovation which was unanimously discouraged by agricultural extension agents. He found that "overadopters", compared with non-adopters, were more affluent, more traditional, more specialized, little in communication with extension agents, and less innovative with respect to recommended farm ideas.

INTERPERSONAL VS. MASS MEDIA: IMPLICATIONS FOR AN INFANT FEEDING CAMPAIGN

The discussion of mass media vs. interpersonal channels of communication has many implications for a program designed to educate the public (or a portion of it) about the ideal infant feeding pattern (or certain aspects of it). Such a program may be composed of specific "campaigns" utilizing any form of communication media. But it would be overly simplistic to assume that a single campaign, no matter how many media it used, could achieve long term success. This is a point which can be easily misunderstood, for it is tempting to think, "If the infant food companies can use the mass media to sell bottle feeding, why can't we use them just as effectively to sell breast feeding or to discourage bottle feeding?" Of course, the staggering success of the infant food companies in using the mass media to initiate or hasten changes in infant feeding patterns cannot be denied. But to fully understand the basis for that success, and to take advantage of it, several points must be kept in mind.

First, infant food advertising has usually entered Third World communities when they were experiencing their first contacts with the Western world and its mass media. Frey (1966) shows that the mass media may be more effective in forming initial attitudes than in changing existing ones. Greiner (1977) found that infant food advertising has been going on in St. Vincent at least since 1935. Bottle feeding is now so entrenched there as a "traditional" aspect of infant feeding, that very little promotional effort appears to be required to maintain mothers' purchasing behavior at the highest levels their income will allow.

Second, although infant food advertising has proven highly effective at the more superficial levels of behavior change, i.e. creating a desire to try a new product, it has failed tragically in achieving the more complicated behaviors involved in using the products properly (this is referred to by the president of one infant formula company as the "continual hazard of product failure" (Cox, 1972)). Furthermore, breast milk substitutes are unique (with the possible exception of narcotics) in the ease with which repeat customers can be secured. A mother encouraged by a "milk nurse" to try a product, or given a free sample, may find that a few weeks later, when the sample has run out, she no longer has the option to breast feed whether or not she can afford to buy more of the product.

Third, infant food advertisers, like other marketers of new products (see Scheuing, 1974), have taken full advantage of the kinds of communication research discussed here. Their promotional efforts involve extensive efforts to penetrate indigenous interpersonal communication channels. A recount of such innovative, if occasionally bizarre, efforts would range from the employment by a Heinz baby food subsidiary of teams of singers, magicians and jugglers to curry favor with mothers (Gooding, 1971), to the Lactogen Diaper Derby, a race in which babies crawl unaided over a measured distance (Willatt, 1970). These and other techniques secure good public relations and a salient place in

personal conversations for the infant food products concerned. Further, sponsoring or cooperating with all types of community activities provides significant contact with opinion leaders. Most important, of course, are the efforts, documented above, to influence and make use of health professionals, who in turn exert powerful influences at the interpersonal level and at the critical juncture in time on the target population, pregnant and postpartum mothers.

Finally, the efforts of infant food advertisers have been long-term and persistent. As early as 1938, Spence was warning about the negative effects of infant food advertising, even pointing out that "the medical profession itself is not free from the influences of advertisement. No doctor receives a blotter once a week advertising breast feeding" (Spence, 1938). A simple mass media campaign to establish an ideal infant feeding pattern would have to have a rather long-term commitment and a large budget to ever hope to compete with the cumulative effects on society of infant food advertising.

Thus the most salient implication of the interpersonal vs. mass media issue is the need to build a total program with solid foundations in interpersonal communication channels. Among the relatively few studies which have been done on the promotion of breast feeding, physician efforts have been shown to increase at least incidence of breast feeding among small populations (Newton and Newton, 1967; Kimball, 1951). However, in most developing countries there are too few physicians, especially in rural areas, to expect physician-patient interaction to have much impact on breast feeding practices. Rather it should be stressed that physicians should be supportive of breast feeding in their contacts with other health professionals, especially paraprofessionals and nurses, as well as with administrators and other decision makers. They could thus play an important role in establishing breast feeding as a national health priority.

Other studies have looked at the effects of improving hospital maternity ward routines (e.g., McBryde, 1951; and Chateau et al., 1973), or of instituting specific programs based in the maternity ward (Blaikley et al., 1953; Sloper et al., 1975). Such studies are geared mostly toward developed countries and their problems with breast feeding (e.g. "lactation failure" during the first few days after delivery). In developing countries such programs might apply to those larger hospitals in big cities which serve higher socioeconomic classes, however, further applications to developing country situations are being explored (see Patterson, 1973, for example).

But in most developing countries, nurses come in contact with mothers much more often and much more intimately than doctors. District nurses often have a detailed understanding of local situations and are very influential among mothers. They are often identified by mothers as their predominant source of information on infant feeding (Almroth, 1976; Greiner, 1977).

Another key interpersonal channel of communication is the shopkeepers. They are often opinion leaders; they often advise mothers on

infant feeding; and they often possess financial and political power. They could undermine a campaign if they perceived it as economically threatening. It might be advisable for health professionals to meet with them at early stages. Shopkeepers as well as import agents could be presented with the problem, shown the relationship between infant feeding practices and economic underdevelopment (cf. Berg, 1973), and asked for their opinions on what should be done. Convincing evidence should be available to show them that simply educating mothers on proper bottle feeding techniques is incapable of solving the problem (see Appendix 2). It could be stressed to them that money saved by the mothers on infant foods would be spent in local shops on other things, and there would be little, if any, loss in total sales.

Rachman (1970) counsels that one of the most powerful ways of securing behavior change is through public commitment. One or more sympathetic storekeepers, perhaps approached before meeting with the others, could have a significant influence by declaring their intention to take positive action. It would have an even stronger effect on strengthening the attitudes of those who took the public stand. Storekeepers might announce their intention to educate mothers who came into their shops about the things they had learned in the meeting, to remove point-of-purchase infant food advertising from their stores, or even to discontinue carrying certain products.

Greiner (1977), in surveying infant food availability in stores in Kingstown, St. Vincent, did find shopkeepers who were strong believers in breast feeding. Some expressed concern about the types of foods they saw some mothers buying for their infants. Some even seemed to feel guilty about the infant foods they were selling "by popular demand". Usborne (1963) showed that these Vincentian shopkeepers could be influenced by health professionals when she convinced even reluctant ones to stock cheaper powdered milks, a practice which apparently has continued.

Probably the medium with the greatest potential for effectiveness is women's organizations such as lactating women's groups or natural child birth organizations. Ladas (1972) has documented the value of the information and support provided by La Leche League in the U.S., at least among the well educated middle to upper class women who tend to participate in it. These groups have spread rapidly in industrialized countries, but are only recently beginning to grow in developing countries. As Jelliffe and Jelliffe (1972) pointed out, the spread of such groups has had to await the interest and activity of the educated, elite mothers in each country itself. Appendix 4 gives addresses of several such groups.

It should be stressed at this point that one of the implications of the interpersonal vs. mass media issue is <u>not</u> that the mass media should be ignored in an infant feeding educational effort. In fact, there are several ways in which the mass media could be used more effectively in less time and with less money than commercial infant food advertising has required. Balcomb (1972) suggests that while people in developing countries are sick of being preached at, the power

of the popular entertainment media is such that these media can teach by sheer example. Soap operas, in particular, may be especially effective and would lend themselves well to many infant feeding messages. Morley (1975) recommends using local "pop" artists to write appropriate songs, utilizing local proverbs and maxims, and using voices of prominent national figures recorded on cassettes.[8]

There is a plethora of simple visual materials that can be used with any kind of talk or presentation, from flannelgraphs to puppet shows. An excellent practical book on the subject, slanted toward needs of those working in the Third World (Saunders, 1974), is distributed by TALC at a minimal cost.[9] Advertisers have learned to efficiently target messages by utilizing only certain media. For example, the breast feeding message could be placed only in women's magazines, or even further narrowed to those catering to brides or parents of babies, if such are available. Radio programs are often carefully designed to appeal only to specific market segments (and the station can tell an advertiser many characteristics of its audience). Also, the message might be aired only at given times of the day. For example, a message presented during the period from 10 a.m. to 2 p.m. will cost less per housewife listener than any other time of the day.

Also, advertisers (and insurance salesmen) have learned that there is an increased openness to attitude and behavior change at certain critical junctures in life. Thus, breast feeding campaign organizers could request address lists from government agencies of school leavers, newlyweds, and parents of newborns. (And they should request that such lists be denied to infant food advertisers!) Direct contact via telephone, mail, or personal visit could then concentrate on the most vulnerable populations.

Of course many financial problems can be solved by applying successfully to government or philanthropic agencies for funds, by appealing to community groups and businessmen, and by requesting gratis assistance from advertising and marketing firms and free access to media time and space through government and industry channels.

Some of these were put into practice by the Housewives Association of Trinidad and Tobago in a short, mass media based breast feeding campaign in 1974 (White, 1974).[10] They solicited the free services of the local Association of Advertising Agencies for producing professional quality copy, and free media time and space from the Trinidad and Tobago

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8/ The sound cassette is a particularly exciting medium, with great flexibility and potential applications that have barely been explored in all areas of nutrition education (see Colle, 1973).

9/ TALC (Teaching Aids at Low Cost), Institute of Child Health, 30 Guilford Street, London WC1N 1EH, is a self-supporting, non-profit organization which provides teaching aids at low cost to health workers, especially those in developing countries, for whom extra price concessions are made.

10/ Alison White is Vice President of HATT, 143 Eastern Main Road, St. Augustine, Trinidad.

Publishers and Broadcasters Association. Various firms and government agencies supplied free paper, poster board, and printing. This campaign was backed by the Caribbean Food and Nutrition Institute and the Ministry of Health which simultaneously arranged briefing sessions to bring health office personnel up to date on breast feeding, and printed hand bills and posters for distribution to the health centers.

Talks were scheduled at schools, PTA's and church groups. The central public library organized a collection of material on breast feeding for display in the capital. Port-of-Spain, as well as in the mobile library for outlying districts. An evaluation was planned.

Most importantly, new ways should be explored of combining the interpersonal and mass media channels of communication to take advantage of their respective strengths. Media forums, successful in agricultural extension work, could also be adapted to an infant feeding campaign. Cassettes, film strips, or posters could be designed for use in maternal and child clinic waiting rooms, and their effectiveness would greatly increase if they were presented by volunteers, as from a lactating women's group, or paraprofessionals, forming the basis for discussion and dialogue.

Insurance companies have found that advertising aimed at the public has had the salutory effect of increasing their agents' pride and confidence in their company (Kleppner, 1975). Perhaps reports on an on-going breast feeding campaign in the mass media could have an analogous effect on those involved in the work. Further, as Raimbault (1974) observes, well-known and admired women could set a valuable example by publicizing on the mass media their successful breast feeding experiences.

DIFFUSION OF INNOVATION: IMPLICATIONS FOR AN INFANT FEEDING CAMPAIGN

Research on the diffusion of innovations has classically been used to increase the rate of adoption of innovation, but these same findings have numerous implications for an attempt to slow the rate of adoption or to encourage rejection of an inappropriate innovation, which bottle feeding often is in developing countries. Figure 13 presents a model developed by Wickström (1971) in a study of infant food marketing. It illustrates four variables in the adoption process of the individual consumer which are within the "transmitter's" or communicator's field of action. Two of the variables, reducing the availability of commercial infant foods and information (advertising) about them, were brought up above.

The third variable, relative cost of commercial infant foods, is an issue which deserves full publicity. The kind of relationships likely to exist between prices for staples vs. commercial infant foods are illustrated for St. Vincent in Table 2. The cost of a cereal or a vegetable is several times higher once it is processed into a commercial infant food. Legumes and dried skim milk would provide the least expensive source of protein, and staple cereals the least expensive source of calories.

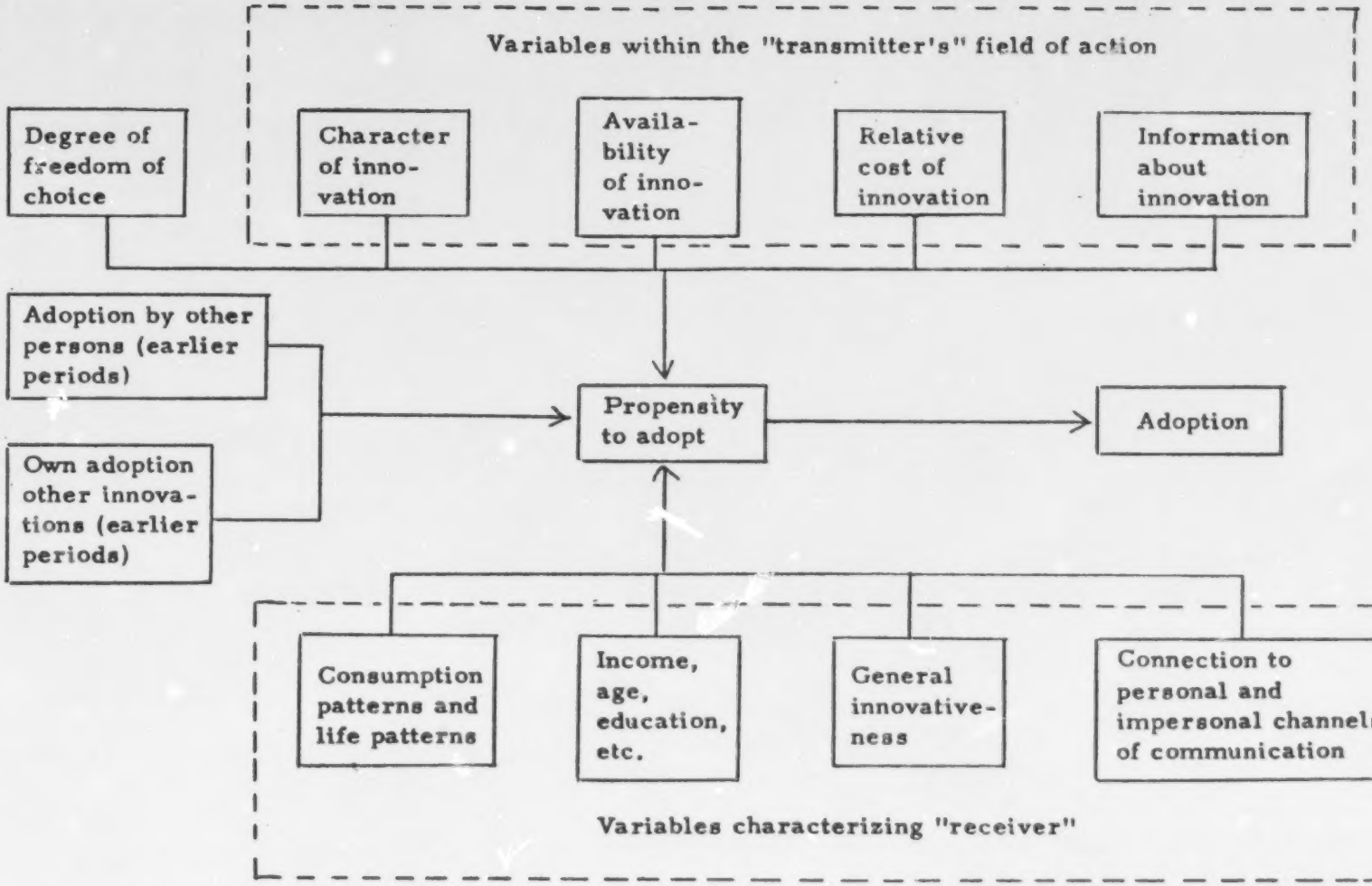
Variables within the "transmitter's" field of action
Degree of freedom of choice
Character of innovation
Availability of innovation
Relative cost of innovation
Information about innovation
Adoption by other persons (earlier periods)
Own adoption other innovations (earlier periods)
Propensity to adopt
Adoption
Consumption patterns and life patterns
Income, age, education, etc.
General innovativeness
Connection to personal and impersonal channels of communication
Variables characterizing "receiver"

Figure 13. Model for the Adoption Process of the Individual Consumer

Source: Wickström, 1971.

Table 2

Cost of Foods as Sources of Protein and Calories in St. Vincent, July, 1975*

Product	No. of brand/sizes	Weighted ave. cost/lb.	Cost/15 g protein	Cost/1000 calories
Commercial infant foods				
Infant formula	12	1.81	.26	.86
Strained baby foods (vegetables)	3	1.09	2.40	5.34
Strained junior baby foods	3	.96	2.12	4.72
Baby fruit juice	3	1.08	11.88	3.66
Brand name baby cereals	14	1.59	.47	.91
Brand name full cream milk powder	32	1.32	.16	.59
Evaporated milk	14	.48	.23	.76
Sweetened condensed milk	5	.68	.28	.47
Glucose	5	.88	infinite	.60
Carbonated soft drink		.22	infinite	1.56
Staple products				
Unbranded full cream powdered milk		.99	.13	.43
Unbranded dried skim milk		.73	.07	.45
Dried fish		1.00	.07	.82
Legumes (average for 5 varieties)		.66	.09	.42
Flour		.24	.08	.15
Cornmeal		.25	.11	.15
Rice		.28	.14	.17
Arrowroot flour		.25	4.17	.16
Carrots		.10	.44	.80
Callalou		.38	.52	3.11
Tannia		.33	.68	.68
Brown sugar		.25	infinite	.15

*Results from a survey done in 25 supermarkets and shops in Kingstown by Greiner (1976). Prices for brand name products were determined by averaging cost for all stores in which that size package of that product was found. These average prices were then weighted according to the number of stores which carried that brand/size. Composition of foods was estimated using product labels, company-supplied information, or Food Composition Tables for the English-Speaking Caribbean (CFNI, 1974).

The figures of 15 g protein and 1000 calories were chosen because they represent the approximate advisable intake for a one-year-old infant at the standard weight of 10 kg (Fomon, 1974: 141).

In most cases, local data could be used to show the relative economic disadvantages of bottle feeding at the family level (Appendix 1) and at the national level (Appendix 3). McKigney (1971) showed that, even with a liberal additional dietary allowance for the lactating mother, breast feeding will always be cheaper. Berg (1973: 92) says the cost of additional calories for the mother will be about one-third of that necessary to provide artificial feeding to the infant.

Habicht et al. (1975) estimate that in Guatemala the cost of bottle feeding is about 10 times the cost of mothers' milk, if the protein and calories in the breast milk are derived from tortillas. Nevertheless they feel that most jobs in Guatemala City in which women cannot breast feed at the same time, will pay more than the additional cost of bottle feeding.

However, Reutlinger and Selowsky (1976: 37) calculate that, in Calcutta, the marginal propensity of spending on the infant diet is only about 5 percent of additional family income. Yet about 50 percent of a working mother's earnings would need to be spent just to replace breast milk and maintain the infant's nutritional status. They conclude that "even under optimistic assumptions, a decline in breast feeding as a result of the mother's participation in the labor force could have an important negative effect on the nutritional status of the child."

The economic value of breast milk at the national level is illustrated in the case of Indonesia by Rohde (1974) who calculates that it would cost at least Rp. 9000 per child to buy the milk necessary to replace even the milk produced during the second year of lactation, equal to $\frac{1}{4}$ of the Indonesian per capita gross national product. Subtracting the cost of complete maternal supplementation, on a national basis, this second year breast milk is still worth U.S. $62 million, 80 percent of the annual Indonesian health budget for 1972-1973. (Second year breast milk is on the order of one-third of the quantity produced during the first year.)

Finally, the cost of malnutrition caused by bottle feeding is very high, although difficult to quantify. Cook (1971) was able to partially estimate only two of six kinds of economic loss due to malnutrition in Jamaica and arrived at an annual cost of one and a half million U.S. dollars.

Economic arguments, when correctly designed for the "target audience", be it a poor mother or a government official, can be particularly valuable.

The fourth variable named as being within the transmitter's field of action, "the character of the innovation", relates to the five attributes of innovation discussed above: (1) relative advantage, (2) compatibility with the person's values and past experiences, (3) complexity, (4) trialability, (5) observability of the results of adoption.

The relative "advantages" most commonly referred to in infant food advertising (Greiner, 1975)--nutritional value and other health-giving properties, convenience, modernity and high status, and low price--can actually be turned against these products when they are compared with breast milk.

Scientific evidence has shown breast milk to be superior in many nutritional respects, especially in its immunological properties (Jelliffe and Jelliffe, 1971). Such facts could be publicized using non-technical, locally appropriate language.

Breast milk is eminently more convenient to obtain than tinned feeds. It is always available at the right concentration and temperature, and comes from quite sanitary containers. The inconvenience of bottle feeding could be stressed by pointing out the necessity to boil water and utensils, a time-consuming, and in fuel-short areas, an expensive chore. Further inconvenience would be involved if formula availability were controlled, for example, if it were given out at centers to those mothers who chose to bottle feed. They could be required to attend classes on proper feeding technique, to bring their children to clinic more often than those who breast fed, and to bring their nursing bottles with them. Of course care should be exercised not to single out bottle-feeding mothers in a way that might reward them for bottle feeding or confer status on them.

The high status often associated with bottle feeding is particularly problematic. Research to determine how bottle feeding achieved its status in a given society might suggest avenues for reversing the trend. A direct attack on status is illustrated by anti-smoking campaigns that sarcastically comment on how "suave" a person looks when smoking while illustrating the opposite. A more subtle approach is taken in "Para mi nino...lo mejor",[11] a booklet which contrasts the somewhat depressed life of a mother who bottle feeds her baby with the happier life of a breast-feeding friend (who wears brighter, slightly higher status clothes). The bottle-feeding mother is then shown joyfully and successfully breast feeding her next baby.

In many societies the most effective message against bottle feeding may be the ways in which it is incompatible with cultural values. Breast feeding could receive prominent mention among traditions worth protecting from colonialist or Western influence. Bottle feeding could be portrayed as both a cultural and an economic invasion.

Bottle feeding is obviously a more complex task than breast feeding. Efforts to publicize this fact should be careful to avoid implying that bottle feeding should be practiced only by more intelligent or literate persons, since that would risk imbuing it with a certain status.

11/ The booklet was developed as part of a multi-media campaign to promote maternal lactation in Chile, where 47,000 copies of it have been distributed. For information on it, contact Ms. Maruka Fernandez, c/o Communications for Development, The Inter-American Literacy Foundation, 25 West 45th Street, New York, New York 10036.

Bottle feeding has a lower trialability than virtually any innovation conceivable: (1) There is no value in practicing bottle feeding on a limited basis; young breast-fed babies require no supplementation and older ones should not receive supplements from a bottle. (2) Many of the protective effects of breast feeding are lost when the bottle is given along with it. (3) If a mother stops giving the breast to try bottle feeding for awhile, her milk will build up, leading to painful distended breasts, possibly resulting in abscesses, and a cessation of breast feeding. (4) Supplemental bottle feeding could result in the baby "weaning himself" because a bottle is easier to suck from than a breast, and its contents may be sweeter than breast milk. (5) When a baby gets some of its food elsewhere, it sucks less vigorously for less time on the breast. This hormonally reduces the mother's output of milk, and may be responsible for an "insufficient" supply of breast milk.

The bottle itself could be portrayed justifiably as a danger, particularly where efforts were being made to encourage mothers to give milk and supplementary food with a cup and spoon instead. In rare cases in which young infants required vitamins or fruit juices in addition to breast milk during the early months of life, these need not be administered by bottle. Also, exclusively breast-fed infants seldom if ever develop a true physiological need for supplementary water, even under tropical weather conditions (Almroth, 1977).

Probably one reason for continued high levels of "over-adoption" of bottle feeding is the low level of observability of its results. Infants receiving overdilute feeds lose weight and eventually develop marasmus in many cases. But the process is slow and hardly discernible to those in constant contact with the infant. Bottle-fed infants in developing countries almost invariably have a higher incidence of infections, but this also may not be readily observable by mothers because, (1) infants of upper class mothers who are properly bottle fed grow well and have few infections, (2) many supposedly breast-fed infants actually receive supplemental bottles which introduce infection and destroy the protective effect of intestinal flora that solely breast-fed babies possess (Gyorgy, 1971), and (3) in many developing areas, the germ theory of disease is unknown or little understood. In St. Vincent, even though literacy and educational levels are very high, 50% of the mothers (N = 165) felt that diarrhea in their infants was caused by teething, and only 8% ascribed it to any hygiene-related cause (Greiner, 1977).

Probably the best way to heighten the observability of the results of infant feeding practices is to distribute weight charts to mothers on which continuous records are kept of each preschool child's growth (Morley, 1973). Nurses, paraprofessionals, or nutrition aides could teach mothers the meaning of these charts and how weight is influenced by feeding practices.

Even mothers who have recently or partially adopted bottle feeding could be convinced to "discontinue" (i.e., revert to breast feeding when possible). It is likely that some cognitive dissonance exists

in most bottle-feeding mothers, and anti-bottle feeding messages might heighten it. These mothers could relieve the dissonance by going back to breast feeding, if only with their next infant. But they also could reduce dissonance by strengthening their belief that bottle feeding is better. In St. Vincent, several mothers claimed to have been forced to breast feed against their well by nurses in the maternity ward after delivery. These mothers were proud to have stopped breast feeding the moment they got home from the hospital, and their neighbors seemed sympathetic (Greiner, 1977). If nurses tended to pressure selectively low income mothers, this could reinforce the attitude that breast feeding is something done only by women of low status.

In planning an anti-bottle feeding campaign, as in any campaign with a negative orientation, extra attention must be given to pretesting and evaluation if undesirable effects are to be avoided. Rachman (1970) stresses that any time a fear approach is used, the audience must be shown a way of alleviating it. For a woman who is still pregnant, planning to breast feed will alleviate the tension. Mothers who are already bottle feeding should be encouraged to visit their district nurse or other health professional. They could be counselled in the following ways: (1) If the baby is young and getting both breast and bottle, bottle feeds could be slowly reduced and eventually eliminated. (2) If the baby is older, the bottle could be replaced with appropriate supplemental foods, given by spoon. (3) The mother should be encouraged to come back for help when the next baby is born to insure that breast feeding progresses smoothly.

As mentioned above, "overadoption" has most often been ascribed to (1) insufficient knowledge about the innovation, (2) inability to predict its consequences, (3) a mania for the new, and (4) seeing the innovation as a panacea (Rogers and Shoemaker, 1971). This would suggest that the consequences of bottle feeding could be publicized.

Use of extreme fear tactics must be made only with caution. Berg (1973: 87) cites an instance in Colombia where advertising, utilizing pictures of severely malnourished children, was used to show before-and-after effects of Incaparina, a weaning food. "The parents did not identify (or preferred to tune out the ugliness of the images) and sales reflected this."

On the other hand, Goddard (1960) describes an actual anti-bottle feeding campaign in South Africa which found shock tactics to be most beneficial. Local health personnel discovered that the infant feeding situation in the Bantu areas of Durban City was desperate. Seven rapid surveys done in the area showed 75% of a total of 195 bottle-fed babies were sick and virtually 100% of the bottles used were filthy. Another rapid survey at four different sites revealed that only 1.7% of 579 infants were being breast fed. A third survey in four areas showed that only 15% of 469 eligible mothers attended free clinics[12]. Interviews with mothers by local Bantu paraprofessionals

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12/ Calculations for all three surveys are mine, based on raw data presented by Goddard.

revealed a very nonchalant attitude toward breast feeding and clinic attendance.

It was decided that drastic measures were needed. A loudspeaker van was equipped with "a shock picture of a dehydrated, malnourished baby, mutely suffering, mounted on a bottle-shaped frame" placed inside a coffin. "A button switched on a light which brought the picture into sharp relief. When this was exhibited, silence fell on the chattering women." On one side of the bottle was the slogan, "Bury the Bottle, Mother, Not the Baby."

This was followed up with teaching on breast vs. bottle, the relationship between dirty bottles and gastro-enteritis, and the need to take children to the clinic when diarrhea first begins. A demonstration of how to wash a bottle was included and filthy bottles were "harvested" from every audience as a pledge to "begin afresh". Bantu fathers were brought into the picture also with eight educational sessions in housing schemes and shack areas and they were found to take the subject quite seriously. A year later the mortality rate for infants under one year had dropped 39%.

The image of commercial infant foods as panacea, a sort of magic potion responsible for healthy bouncing babies overseas, should be fought. Its close connections with health professionals may have fostered the myth that infant formulas act as tonics or medicines. Greiner (1977) found that in St. Vincent 6.6% of a sample of 152 mothers felt that infant formula acts like a medicine, 46.7% felt that it acts like a tonic, and 46.7% felt that it acts only like a food.

One way of opposing the "mania for the new" would be to stop infant food advertising. In the broadest context, it might involve questioning the entire Western approach of trying to control, overcome, or "improve on" nature and such natural activities as breast feeding.

CONCLUSION

It is gratifying to note the recent prodigious growth of interest in developing educational programs or campaigns to promote an ideal infant feeding pattern, especially the breast feeding component (see Formon, 1975; Pechevis, 1975; International Pediatric Association, 1975; FAO/SIDA, 1975; and Fernandez, 1975).

Hopefully this increased interest will lead to stable, long-term programs making use of available mass media, but depending mainly on interpersonal communication and, as Cicely D. Williams stressed (1950), on example rather than precept.

It may not be possible to find an entire society in which an infant feeding pattern approaching the ideal is now the norm. But in spite of the sobering statistics about the recent widespread shift from breast feeding to bottle feeding, in a large segment, if not the majority, of the population in most developing countries, extended breast feeding is the norm and bottle feeding is rare. Surely a high

priority must be placed on maintaining this situation, in protecting such populations from penetration by commercial infant food companies.

Voices from the infant food industry and even from some health professionals are becoming more and more insistent that the decline of breast feeding is inevitable; that the causes are beyond our control; and that the proper channel for our concerns lies in making artificial commercial breast milk replacements more readily available, perhaps at subsidized prices. Such views may gain an increased following in the near future. Early breast feeding campaigns may seem to fail, as we are just beginning to learn and experimentally try out methods of stemming or reversing the trend from breast to bottle. However, there are grounds for optimism, that in time these efforts will be successful. Particularly promising is the possibility of adding an anti-bottle feeding component to a breast feeding campaign. The increase in international awareness and concern about the trend has grown exponentially in just the last few years. There is every hope that this concern can lead to effective counteracting measures, assuming that financial and political support for them are forthcoming.

Furthermore, a reversal of the trend from breast to bottle appears to be taking place already in Norway (Helsing, 1973), Sweden (Hofvander, 1976) and the United States (Greenwick Research, 1976). In the U.S. this trend may be occurring largely among groups of higher SES (Srabstein, 1976). To whatever extent elites in developing countries may look to these countries as trend setters, this could presumably be beneficial in the Third World also.

But the greatest hope for developing countries lies in the recent trend toward self-reliant development, defined by Marchione (1976) as "gaining control over relevant natural and social environment so that valuable indigenous local cultural elements can be revitalized and local socio-economic systems can be enhanced."[13] The consumption of commercial infant foods is an outstanding example of what E. F. Schumacher (1973: 183) is talking about when he says, "poor countries slip, and are pushed, into the adoption of production methods and consumption which destroys the possibilities of self-reliance and self-help. The results are unintentional neocolonialism and hopelessness." And certainly breast feeding must be one of the most "valuable indigenous local cultural elements" deserving revitalization.

13/ Marchione cites Beckford (1972) and Manley (1974) as examples of growing interest in self-reliant development among West Indian academics and politicians.

APPENDIX 1

Cost of Bottle Feeding in St. Vincent

An accurate estimate of the cost of bottle feeding over the cost of breast feeding would require: (1) knowledge of maternal dietary patterns and of costs of foods as eaten, to obtain the cost of extra food required for lactation; (2) knowledge of the necessary quantities of nursing bottles, sterilization equipment, and fuel needed for hygienic bottle feeding; and (3) knowledge of the cost of the milk needed to provide adequate nutrients for the infant. For this analysis, data were insufficient on the first two points. Therefore, only data on the third will be utilized. The fact that the first two act in opposite directions suggests that the resulting estimations will not be of a totally inaccurate magnitude.

The most widely used commercial infant food in St. Vincent, West Indies, based on a 1975 survey (Greiner, 1977) was Nestle's Lactogen, used for at least a short period by about 70% of the mothers (N = 188). It also is probably the most widely used infant formula in the Third World. The intermediate size (1 pound) tin was the most commonly purchased and cost about U.S. $1.65.

Directions on the Lactogen tin call for 3.75 ounces of milk powder per day for a three-month-old infant, and 5 ounces of milk powder for a six-month-old infant. This provides 491 and 655 calories, respectively. FAO/WHO (1973) requirements for three- and six-month-old infants of standard weight for age are 656 and 814, respectively 34% and 24% higher than Lactogen's recommendations.

Utilizing the Lactogen feeding schedules (which results in a conservative cost estimate), the weekly cost of feeding for an exclusively bottle-fed three-month-old infant would be: 7 days/week X 3.75/16 pounds per day X $1.65/pound = $2.70. The figure for a six-month-old infant would be $3.60.

How does this compare with income in St. Vincent? Several estimates of per capita GNP place it slightly above U.S. $200 per year in the early 1970's (British Development Division in the Caribbean, 1970; International Bank for Reconstruction and Development, 1973; and Smith and Doughty, 1974). This would suggest a 1975 estimate on the order of about $5 per week, less than twice the cost of Lactogen.

However, per capita GNP probably does not accurately reflect the incomes of the majority, particularly outside the capital city, Kingstown. In the small Leeward town of Layou, all mothers of infants age 12-24 months were questioned about size of the household and the entire household expenditure per week.[14] Responses were received from 70

14/ This data had been gathered by the St. Vincent Community Health Action Programme.

of 91 mothers questioned (77%). The mean weekly household expenditure per member of the household was $2.30 and the median was $1.75, well below the cost of bottle feeding. In fact, only 14% of the 70 respondents reported a per capita weekly expenditure greater than the $3.60 cost of feeding Lactogen to a six-month-old infant, and only 26% spent more than the $2.70 cost for a three-month-old infant.

The calculations, though rough estimates, provide some indication of the financial stress bottle feeding puts on a Vincentian family. Undoubtedly some mothers responded by overdiluting each feed (see Antrobus, 1971). Some said they made the tin last longer by interspersing milk feeds with bottles of sugar water or "bush teas", infusions of local herbs.

APPENDIX 2

Problems with Bottle Feeding Hygiene in St. Vincent

St. Vincent provides an unusual opportunity to study the feasibility of the strategy of teaching mothers to properly bottle feed as a solution to the problems caused by the spread of bottle feeding. Bottle feeding was well established in this small former British colony by the 1940's (infant food advertising was present in old newspapers as long ago as back copies were available: 1935) and is now virtually universal, though usually combined with breast feeding. For many years, health professionals, especially the influential district nurses, have been attempting to teach proper bottle feeding to the mothers. The following points reveal some of the long-term results of these efforts:

(1) When I first began my survey of 194 mothers, it appeared as though efforts to teach mothers to sterilize bottles and keep flies off them had been successful. Gradually I came to realize how most mothers "sterilized" their bottles: they "scalded them out" with water which had been boiled in the morning and kept hot in a thermos or "flask" throughout the day. I then began to question more intensely mothers who said they sterilized or boiled the bottle. Of 87 such mothers, 18.4% continued to maintain that they boiled the bottle at each use; 6.9% said they boiled it only sometimes; 8.0% said they actually only boiled the nipple; 5.7% said they just poured boiling water into the bottle; and 59.8% actually just "scalded out" the bottle with hot water.

(2) Kitchen facilities were usually very simple. Very few homes had electricity, let alone refrigeration. Only 6% of the families had access to gas cooking facilities. Others used kerosene, coal pots, wood, or a combination. Wood fires were the only cooking facility for 35% of the mothers. Some of these "three stone kitchens" were outdoors, and some were in a small shed or lean-to such as the one pictured in Figure 14. Bottles and tins were usually left out on a table or shelf (though often covered), as storage space was scarce. One reason that most mothers boiled water in the morning for use in "sterilizing" the bottle throughout the day may have been the impossibility of monopolizing the family's only pot for that purpose.

(3) It is difficult to clean thoroughly milk residue from a bottle without running water, which only 6.5% of the mothers had. Some of the bottles I saw were encrusted with old milk. But the vast majority of the mothers appeared to be making a sincere effort to keep the bottle free from visible dirt at least. Table 3 lists their ingenious use of locally available materials to get down inside the bottles during washing.

Having a bottle brush seemed to be a sign of status. Several mothers let me know that they used to have one, but it had gotten lost or destroyed. I saw many brushes that were continuing to give service in spite of being caked with filth, almost bare of fibers, or bent and rusty.

Figure 14. Three Stone Kitchen in St. Vincent

Table 3

Method Used by Mothers for Cleaning Inside of Feeding Bottles

Method	Number	Percent
Bottle brush	70	41.1
Piece of cloth, rag, or sponge	34	23.0
Coconut fiber	29	17.1
Sand or gravel	17	10.0
Shake bottle with soapy water only	11	6.5
Toothbrush	3	1.8
Ashes	1	0.6
N =	170*	100.0

*Mothers reporting multiple methods were recorded only for the method lowest on this list.

Some mothers who could not afford a bottle brush simply shook the bottle with soapy water inside, while others made use of the cleansing effect of adding sand before shaking. Many of those who used a rag or cloth or a piece of coconut fiber volunteered that they were able to rub it around inside by using a stick, though one said she used her finger, and one a fork.

(4) When asked if they used soap to clean the bottle, 90.2% said yes, 6.9% said sometimes (usually, "when I can afford it"), and 2.9% said no (N = 175).

(5) Health professionals told me that efforts had been made to convince mothers to switch from plastic to glass bottles. The plastic ones, I was told, could not be properly sterilized. They were usually opaque so that dirt inside was invisible, and they harbored filth in places where they had been scratched.

Many mothers, when I asked which kind of bottle they used, said, "plastic. but the more expensive kind". I slowly came to understand that this kind was clear, rather hard, and could withstand boiling. In fact, these may have been a better choice than glass. Many mothers complained bitterly that they had tried to use the more expensive glass bottles, only to have them constantly breaking. (One, who could not afford to replace a broken feeding bottle, showed me a cracked soft drink bottle she was using instead, since at least it was made of glass.)

Ironically, many of the mothers who used both plastic and glass bottles said that they had to "scald out" or even boil the plastic one to keep it from going sour, but that the glass one needed only an occasional washing to keep it fresh. "Just a little Breeze every day or two keeps the glass one looking pretty for a long time," said one mother.

(6) It appeared to be impossible to get extra nipples. A large percentage of the ones I saw were old and hard. Often they had been cut into a wide-open hole with sharp, jagged, hard edges. One mother told me she had to buy a plastic bottle (she used only glass) just to get another nipple.

(7) The cost of a feeding bottle, even a plastic one, may be a burden on many mothers in developing countries. Almroth (1976) found that the number of feeding bottles was an excellent indicator of economic status in her rural Jamaican sample. In my sample, 1.7% of the mothers had no bottles at the time of the interview; 77.8% had one; 18.3% had two; 1.7% had four; and one mother had "many" (N = 180). The zero order correlation between the number of bottles and the total weekly household food expenditure was $r = .407$, significant at the $P < .001$ level (N = 123).

A mother without refrigeration or running water and only one feeding bottle (sometimes shared by two infants) would have to spend an inordinate amount of time to properly bottle feed. If she could afford a thermos she could boil enough water for two or three feeds at one time, rather than boiling it and letting it cool for each feed while the infant screamed. (It is very difficult to mix milk powder in hot water.) After the feed, she would have to wash the bottle in water which had been carried some distance to the house. Then she would have to boil more water to sterilize the bottle. This assumes she has access to an extra pot and heat source in addition to the one being used for the family pot, and can afford plenty of extra fuel. Obviously, a lesson on bottle hygiene cannot solve her problems. In fact, the only way bottle feeding ever will succeed in developing countries is when the same conditions are met which historically allowed it to succeed in developed countries: a highly advanced economic standard of living, and nearly universal education for females.

APPENDIX 3

Value of Breast Milk Lost in St. Vincent

(1) Value of average potential annual breast milk production in St. Vincent:

a. Average number of live births, 1970-1974, was 3472 (calculated from data in St. Vincent Statistical Unit, 1975: Table 5).

b. It is assumed that infants would receive 800 ml breast milk per day for the first six months, and 400 ml per day for the next six months, and that concurrently, second year infants would receive 400 ml per day from age 12-18 months, and 200 ml per day from 18-24 months. Since an average of 233 infants under one year of age died annually from 1970-1974 (calculated from St. Vincent Statistical Unit, 1975: Table 5), the number of second year infants would be an average of 3472 - 233 = 3239. Thus, total annual potential breast milk production would equal:

3472 infants X .800 liter/day-infant X 183 days/6 months = 508,301 liters in the first six month period
3472 X .400 X 183 = 254,150 liters in the second six month period
3239 X .400 X 183 = 237,095 liters in the third six month period
3239 X .200 X 183 = 118,547 liters in the fourth six month period

Total 1,118,093 liters

c. The actual economic value of this breast milk could be estimated only by taking into account the cost of whatever disease and death resulting from its loss, and the cost of bottles, sterilization equipment and fuel. However, only the value of the powdered milk necessary to replace the breast milk is estimated here.

Four of the brands of full cream powdered milk available in St. Vincent provided instructions for adding sugar to make formula and included infant feeding schedules. Based on local cost of the quantities of milk and sugar needed for a four-to-five-month-old baby, each of those brands would cost about $.40 per reconstituted liter. Assuming that each liter is "equivalent" to one liter of breast milk (in most ways it is not), the value of the average potential annual breast milk production in St. Vincent would then be:

1,118,093 liters X $.40/liter = U.S. $447,237.

(2) Value of breast milk actually produced:

Almost all Vincentian mothers gave both breast and bottle simultaneously during nearly the full course of breast feeding. To estimate the quantities of breast versus bottle given, mothers were asked how often they typically gave each during the day and night, and/or whether they thought, overall, their baby had received more breast or bottle

milk. From this data, 47% of the mothers were classified as "more breast", 38% as "more bottle", and 16% as "about equal" (N = 144). The mean age of introduction of non-human milk was 30 days (including mothers who never breast fed at all). A simple and fairly accurate way to take these two aspects of the average infant feeding pattern into account mathematically was to assume that all milk consumed up to 30 days of age was breast milk, and 50% of milk consumed after that age was breast milk. To estimate the value of breast milk consumed by Vincentian infants, I assume also that the weaning pattern found in my sample is representative. At the time of the interviews, 24 infants were still being breast fed (mean age 16 months). In the following calculations, each of these 24 infants is treated as if it were weaned three months after the interview.

1st month: 3,472 infants X 100% being breast fed X .8 liters/day and infant X 30 days X $.40/liter = $33,331.

The results of these calculations for each month are tabulated below. When a change occurs in the value of a variable in the equation given above, it is noted for that month, and holds for all succeeding months.

Month	% infants being breast fed	Value of breast milk
1	100 (receiving only breast milk)	$33,331
2	86 (receiving 50% breast milk)	14,332
3	74	12,333
4	69	11,499
5	60	9,999
6	55	9,166
7	49 (X.4 liters/day-infant)	4,083
8	42	3,500
9	32	2,666
10	30	2,500
11	28	2,333
12	13	1,500
13 (3,239 infants)	17	1,322
14	17	1,322
15	14	1,088
16	11	855
17	9	700
18	8	622
19	7 (X.2 liters/day-infant)	272
20	5	194
21	4	155
22	2	78
23	1	39
24	1	39
	Total	U.S. $113,928

(3) Value of breast milk lost:

Each year Vincentian mothers of infants under two years of age could produce breast milk worth about $447,237. However, infants only

receive breast milk worth about $113,928. The annual loss would thus be about $333,309. This is equal to about 23% of the estimated total expenditure on health by the St. Vincent government in 1974 (Government of St. Vincent, 1975: Table 19).

The method used here has been adapted from that published by Berg (1973) in Appendix C of The Nutrition Factor.

APPENDIX 4

Resources for Efforts in Reversing Current Infant Feeding Trends

I. Breast feeding

A. Maternal Lactation Groups (wide variety of supportive activities, publications and teaching aids)

1. La Leche League International
9616 Minneapolis Avenue
Franklin Park, Illinois 60131 USA

--groups or representatives in at least 47 countries

--information service for other countries, c/o Eleanor Randall, at address above

2. Breast Feeding Promotion Group
National Childbirth Trust
9 Queensborough Terrace
London, W2. England

3. Ammehjelpen
Boks 15
Holmen, Oslo 3
Norway

4. Amningshjälpen
Box 4056
171 04 Järfälla
Sweden

5. Nursing Mothers of Australia
P. O. Box 230
Hawthorn 3122
Australia

6. Susu Mamas
Box 5857
Boroko
Papua New Guinea

7. Persatuan Penasihat Penyusuan Ibu
(Selango Mothers' Breast Feeding Association)
3rd Floor 8
Jalan Klyne
Kuala Lumpur 01-21
Malaysia

B. Other Groups Offering Information

1. International Childbirth Education Association
Box 5852
Milwaukee, Wisconsin 53220 USA

2. Caribbean Food and Nutrition Institute
P. O. Box 140
Kingston 7, Jamaica

C. Available Audio-Visual Resources (not necessarily recommended)

1. "Mother and Child"--15 minute color film by the La Leche League, available from Mary Jane Co., P. O. Box 736, North Hollywood, California 91609 USA

2. "Talking About Breast Feeding", "Infant Feeding and Nutrition"--write for free catalog to Polymorph Films, Dept. K, 331 Newberry Street, Boston, Massachusetts 02115 USA

3. Maruka Fernandez, c/o Communications for Development, Inter-American Literacy Foundation, 25 West 45th Street, Room 1203, New York, New York 10036 USA. Ms. Fernandez has created a 1 minute color film in English ($25), a 1 minute video tape in Spanish ($20), and a color booklet in Spanish, "Para Mi Nino lo Mejor", all designed for use in breast feeding campaigns.

4. TALC--Teaching Aids at Low Cost
Institute of Child Health
30 Guilford Street
London WC1N 1EH
England

Distributes at low cost a selection of teaching aids, mainly for use in training paraprofessionals in developing countries, including a set of color slides on breast feeding.

5. A set of 22 color slides depicting various aspects of breast feeding is available for $18 from Mary Jane Otte, 1248 Deodara Drive, Los Altos, California 94022 USA

II. Bottle Feeding

A. Publications

1. The Baby Killer by Mike Muller, published by War on Want, 467 Caledonian Road, London N7 9BE, England (40 p.)

2. "The Promotion of Bottle Feeding by Multinational Corporations: How Advertising and the Health Professions Have Contributed" by Ted Greiner, available from Dr. Michael C. Latham, Division of Nutritional Sciences, Cornell University, Ithaca, New York 14853 USA ($2.50)

3. "Bottle Babies, a Guide to the Baby Foods Issue" by Jane Cottingham published by Women's International Information and Communication Service, Case Postale 301, 1227 Carouge, Switzerland and Via della Pelliccia 31, 00153 Rome, Italy.

B. Film

"Bottle Babies" by Peter Krieg produced by Teldok Films, Chlodwigstr. 29, 504 BRUHL/Cologne, West Germany. Can be rented for $15 from American Baptists Films, c/o American Baptist Convention, Valley Forge, Pennsylvania 19481, or purchased for $195 plus postage from the National Council of Churches, Audio Visual Department, 8th Floor, 475 Riverside Drive, New York, New York 10027

C. Study and Action Groups Concerned with Infant Food Issues:
United States: (1) Eco-Justice Task Force, Interfaith Center on Corporate Responsibility, 475 Riverside Drive, New York, New York 10027. (2) Baby Food Abuse Action Group, P. O. Box 12913 Commerce Station, Philadelphia, Pennsylvania 19108. (3) Center for Science in the Public Interest, 1779 Church Street, N.W., Washington, D. C. 20036.
Canada: (1) Wes Maultsaid, British Colombia Inter-Church Committee for World Development Education, 150 Rubson Street, Vancouver, BC V6B 2A7. (2) Renate Pratt, Task Force on Churches and Corporate Responsibility, 6000 Jarvis Street, Toronto, Ontario M4Y 2J6
Denmark: NOAH, c/o Torben Mahneke, Hyskensstr. 16. IV, Copenhagen 1207K
Germany: Study Group for Social-Economic Problems, c/o Geog Biemann, Brauweilerstr. 48, 5000 Cologne 40
Holland: DE CLAT, c/o Me. W. Harms, Rusthoflaan 12D, Rotterdam 11.
Norway: Ammemjelpen, Boks 15, Holmen, Oslo 3, ATTN: Kari Pape
Sweden: Eva Tobisson, Inst. för Socialantropologi, Göteborgs Universitet, Karl Johansgatan 27, Göteborg 41459
Switzerland: (1) Christian Medical Commission, World Council of Churches, 150 Route de Ferney, 1211 Geneve 20. (2) Declaration de Berne, Case Postale 97, 1000 Lausanne, ATTN: Francoise de Vargas. (3) Anne-Marie Holenstein, Food and Nutrition Working Group, International Peace Research Association, Gartenhofstr. 27, 8004 Zurich. (4) Arbeitsgruppe Dritte Welt, Postfach 1007, 3001 Bern

REFERENCES

Almroth, S. (1976) Breast feeding practices in a rural area in Jamaica. Master's Thesis, Division of Nutritional Sciences, Cornell University.

Almroth, S. G. (1977) Water requirements of breast-fed babies in a hot climate. In Press.

American Home Products (1976a) Supplement to Statement of Wyeth International Limited Regarding Promotion and Sale of Infant Formula Products Abroad. Mimeographed publication of February 18, 1976.

American Home Products (1976b) International marketing of infant formula products. Published statement of June 1, 1976 (mimeo.).

Antrobus, A. C. K. (1971) Child growth and related factors in a rural community in St. Vincent. J. Trop. Pediat. 17: 187.

Antrobus, A. C. K. (1975) The use of volunteers in community nutrition programmes. Cajanus 8(3): 183-189.

Applebaum, R. M. (1970) The modern management of successful breast feeding. Pediatric Clinics of North America 17(1): 203-225.

Balcomb, J. (1972) Some thoughts on nutrition-education and the mass media in developing countries. Paper presented to a conference on nutrition education of the Committee on Nutrition Education of the Public. International Union of Nutritional Sciences, Guadalajara, Mexico, 31 August - 1 September, 1972.

Ballarin, O. (1970) The viewpoint of industry. PAHO/UNICEF Conference on Infant Feeding, Bogota, Colombia, 5-6 November, 1970, Annex II.

Beckford, G. (1972) Persistent Poverty: Underdevelopment in Plantation Economies of the Third World. New York: Oxford University Press.

Berg, A. (1973) The Nutrition Factor. Washington, D. C.: The Brookings Institute.

Berg, A. and R. Muscat (1973) Nutrition program planning: an approach. In: A. Berg, N. Scrimshaw and D. Call (eds.), Nutrition, National Development and Planning. Cambridge: MIT Press, p. 242.

Blaikley, J. et al. (1953) Breast feeding: factors affecting success. J. Obs. and Gyn. of the Brit. Empire 60: 657-669.

British Development Division in the Caribbean (1970) St. Vincent Economic Survey and Projection.

Brown, R. E. (1973) Breast feeding in modern times. Amer. J. Clin. Nutr. 26: 556.

CFNI (1968) What the health inspector can do to prevent malnutrition. Cajanus 1(5): 50-63.

CFNI (1968) Food Composition Tables for Use in the English-Speaking Caribbean. Kingston, Jamaica: Caribbean Food and Nutrition Institute.

Cagas, C. R. (1972) On drug company sponsorships of medical society activities. Philippine J. of Pediatrics 21(4): 151.

Carter, O. L. (1969) Supplementary foods in relation to nutrition. CFNI Library. DCN thesis No. 9.

Chaffee, S. H. (1972) The interpersonal context of mass communication. In: F. G. Kline and P. J. Tichenor (eds.), Current Perspectives in Mass Communication Research. Beverly Hills: Sage Publications.

Chateau, P. et al. (1973) Relationship between feeding routine at the maternity ward, weight development and the duration of breast feeding. Acta Paediat. Scand. Suppl. 236, p. 33.

Colle, R. D. (1973) CSCS: An experimental system for communication with hard-to-reach people. Current Papers in Communication Arts, Series #1. Communication Arts Graduate Research and Teaching Center, Cornell Univ.

Committee on Nutrition of the American Academy of Pediatrics (1976) Commentary on breast-feeding and infant formulas, including proposed standards for formulas. Pediatrics 57: 278-285.

Cook, R. (1971) The cost of malnutrition in Jamaica. Ecology of Food and Nutrition 1: 61-66.

Cox, D. O. (1972) Economics of feeding infants and young children in developing countries. Paper presented to an Ad hoc Working Group Meeting on Feeding the Preschool Child. WHO, Geneva, 11-13 December, 1972.

Crawford, R. H. (1974) Communication strategies for rural development. Paper presented to the Cornell-CIAT International Symposium on Communication Strategies for Rural Development. Cali, Colombia, March, 1974. Published as Communication Arts Series #7, Communication Arts Graduate Teaching and Research Center, Cornell Univ.

Douglass, E. F. (1972) Specialists in communication and nutrition: two people who need each other. Paper presented at nutrition education conference of the Committee on Nutrition Education of the Public. International Union of Nutritional Sciences, Guadalajara, Mexico, 31 August - 1 September, 1972.

Drummond, T. (1975) Using the method of Paulo Freire in nutrition education: an experimental plan for community action in Northeast Brazil. Cornell University International Nutrition Monograph Series Number 3.

Dwyer, J. T. (1975) The demise of breast feeding: sales, sloth or society? In: J. Mayer (ed.), Priorities in Child Nutrition in the Developing Countries. United Nations Economic and Social Council E/ICEF/L.1328, Volume 2, pp. 331-372.

Edozien, J. C. et al. (1976) Protein deficiency in man: results of a Nigerian village study. Journal of Nutrition 106: 312.

Everdell, R. and M. Jacobson (1976) The baby food industry--who benefits? Nutrition Action 3(12): 7-8.

FAO/SIDA (1975) Project Proposal for the 10th FAO/SIDA Programme, Improved Maternal/Child Feeding Practices (Malaysia and Sri Lanka), TF-INT. 211 (SWE).

Fernandez, M. (1975) The need for a media campaign to promote breast-feeding designed for Spanish speaking populations. Grant Proposal, Inter-American Literacy Foundation, 25 West 45th Street, No. 1203, New York, New York 10036.

Fomon, S. J. (1974) Infant Nutrition. Philadelphia: W. B. Saunders Co.

Fomon, M. (1975) Preface. In: Jelliffe et al., 1975.

Francis, D. (1960) Communication credibility of a non-recommended innovation. MS Thesis, Columbus: Ohio State University. Cited by Rogers and Shoemaker (1971: 164).

Freire, P. (1970) Pedagogy of the Oppressed. New York: Seabury Press. Cited by Drummond (1975).

Freire, P. (1973) Education for Critical Consciousness. New York: Seabury Press.

Frey, F. W. (1966) The mass media and rural development in Turkey. MIT Center for International Studies, Rural Development Research Report 3. Cited by Rogers (1969).

Fuglesang, A. (1973) Applied Communications in Developing Countries, Ideas and Observations. Uppsala, Sweden: Dag Hammarskjöld Foundation.

Fuglesang, A. (1974) Mass communication applied to nutrition education of rural populations: an outline of strategy. PAG Bulletin 4(1): 7.

Goddard, J. (1960) Bury the bottle, mother, not the baby. International J. of Health Education 3: 128-131.

Gooding, J. (1971) Heinz battles for space on a worldwide shelf. Fortune 84: 76, October.

Gordon, T. G. et al. (1964) Acute diarrheal disease in less developed countries. WHO Bulletin 31: 15.

Government of St. Vincent (1975) Vital Statistics 1974, Health Statistical Unit, March 1975.

Grantham-McGregor, S. M. and E. H. Back (1970) Breast feeding in Kingston, Jamaica. Archives of Disease in Childhood 45: 404.

Greenwich Research (1976) A Study of the Infant Feeding Market (conducted for American Baby Magazine, 575 Lexington Avenue, New York, New York 10022; June, 1976).

Greiner, T. H. (1975) The promotion of bottle feeding by multinational corporations: how advertising and the health professions have contributed. Cornell University International Nutrition Monograph Series Number 2.

Greiner, T. H. (1977) MS Thesis on infant feeding in St. Vincent, West Indies. Ithaca: Cornell University. In Preparation.

Gunn-Munro, S. (1975) Personal communication with the author, July.

Guthrie, H. A. (1969) Infant feeding and maternal nutrition in four Tagalog communities. In: W. F. Bello and A. de Guzman (eds.), Modernization, Its Impact in the Philippines IV, IPC Paper No. 7. Quezon City: Ateneo de Manila University Press, pp. 60-92.

Gyllenswärd, A. (1975) Medical standards for marketing of infant foods. (Translated from older Swedish original.) Available from Prof. Bo Vahlquist, Pediatric Clinic, University Hospital, 75014 Uppsala, Sweden.

György, P. (1971) Biochemical aspects. Amer. J. Clin. Nutr. 24: 968-1024.

Habicht, J.-P. (1975) Repercussions of lactation on nutritional status of mother and infant. Proc. 9th Int. Congr. Nutrition, Mexico, 1972, Vol. 2, pp. 106-114. Basel, Switzerland: Karger.

Hakim, P. and G. Solimano (1975) Supplemental feeding as a nutrition intervention: the Chilean experience in the distribution of milk. MIT International Nutrition Planning Program Discussion Papers No. 2, Cambridge, Mass.

Heer, J. (1966) World Events 1866-1966, The First Hundred Years of Nestle. Nestle's Centenary Publication.

Helsing, E. (1973) Breast feeding in Norway. PAG Bulletin 3(4):30.

Heywood, P. and A. Heywood (1973) Please breast feed your baby and keep the bottle for yourself. Cajanus 6(2): 95.

Hofvander, Y. (1976) Personal communication with the author.

Indonesian Current Affairs Translation Service Bulletin, Feb. 1976, pp. 141-142. Antara News Agency, Jalan Antara 53, Jakarta Pusat, Indonesia.

International Bank for Reconstruction and Development (1973) World Bank Atlas. Washington, D. C.: World Bank.

International Pediatric Association (1975) Recommendations for action programs to encourage breast feeding. Bulletin of the IPA, Series 2, No. 4, Oct. 1975, p. 19-22.

Jelliffe, D. B. (1970) The urban avalanche and child nutrition. J. Amer. Diet. Assn. 57: 114.

Jelliffe, D. B. (1975) Advertising and infant feeding. J. Trop. Ped. 21(4): 161-162.

Jelliffe, D. B. et al. (1975) Breast Feeding and Weaning Foods (annotated bibliography). Washington, D. C.: AID, Dept. of State.

Jelliffe, D. B. and E. F. P. Jelliffe (1971) (eds.) The uniqueness of human milk. Am. J. Clin. Nutr. 24: 968-1024.

Jelliffe, D. B. and E. F. P. Jelliffe (1972) Education of the public for successful lactation (psycho-social considerations). Children in the Tropics, No. 82.

Jelliffe, D. B. and E. F. P. Jelliffe (1974) Doulas, confidence and the science of lactation. J. Pediat. 84: 462-464.

Jelliffe, D. B. and E. F. P. Jelliffe (1975) The midwife's role in the nutrition of the mother and child. Cajanus 8(3): 167-182.

Jelliffe, E. F. P. (1975) The impact of the food industry on the nutritional status of infants and preschool children in developing countries. In: Priorities in Child Nutrition in the Developing Countries, J. Mayer (ed.). United Nations Economic and Social Council E/ICEF/L.1328, Volume 2, p. 253.

Kaplan, A. (1964) The Conduct of Inquiry: Methodology for Behavioral Science. Scranton: Chandler Publishing. Cited by Kar, 1976.

Kar, S. B. (1976) A model for communication intervention: ethical and scientific dimensions. Ethics in Science and Medicine 3: 149-164.

Kimball, E. R. (1951) Breast feeding in private practice. Quarterly Bull. Northeastern Univ. Med. School 25: 257.

King, C. W. (1969) Fashion adoption: a rebuttal to the "trickle down" theory. In: Dimensions of Consumer Behavior, 2nd Edition, J. V. McNeal (ed.), New York: Appleton-Century-Crofts, p. 182. Cited by Scheuing, 1974.

Klapper, J. T. (1960) The Effects of Mass Communication. New York: The Free Press.

Kleppner, O. (1975) Advertising Procedure, 6th Edition. Englewood Cliffs, N. J.: Prentice-Hall, Inc.

Ladas, A. (1972) Breast feeding: the less available option. J. Trop. Pediat. Monograph No. 25: 317-346.

Lall, S. (1975) Major issues in transfer of technology to developing countries. A case study of the pharmaceutical industry. UNCTAD TD/B/C.6/4, October 8, 1975.

Langdon, S. (1975) Statement on the marketing of infant food preparations in Kenya. Based on doctoral thesis, University of Sussex. Address: Dr. Steven Langdon, Department of Economics and Accounting, Carleton University, Ottawa 1, Canada.

Latham, M. (1975) Nutrition and infection in national development. Science 188: 561-565.

Ledogar, R. (1975) Hungry for Profits. New York: IDOC/North America.

Lemert, J. B. (1966) Two studies of status conferral. Journalism Quarterly 43 (Spring): 25-33. Cited by Chaffee (1972).

Lönnerdal, B. et al. (1976) Breast milk composition in Ethiopian and Swedish mothers. II. Protein content and composition. Amer. J. Clin. Nutr. 29: 1134-1141.

Maack, E. M. (1976) Susu Mamas: breast is best in Papua New Guinea. Keeping Abreast Journal 1(2): 123.

Manley, M. (1974) The Politics of Change: A Jamaican Testament. Tonbridge Kent: Andre Deutsch.

Manoff, R. K. (1973) Mass media contributions to intervention programs. In: A. Berg, N. Scrimshaw and D. Call (eds.), Nutrition, National Development and Planning. Cambridge: MIT Press, p. 217.

Manoff, R. K. (1974) The effective use of mass media in nutrition education. PAG Bulletin 4(1): 12.

Marchione, T. J. (1976) Food and nutrition policy in self-reliant national development. Paper presented at the American Anthropological Association Meeting, November 19, 1976.

McBryde, A. (1951) Compulsory rooming-in on the ward and private newborn service at Duke Hospital. JAMA 145: 625-627. Cited by Jelliffe et al., 1975.

McCombs, M. E. (1972) Mass communication in political campaigns: information, gratification, and persuasion. In: F. G. Kline and P. J. Tichenor (eds.), Current Perspectives in Mass Communication Research. Beverly Hills: Sage Publications.

McKigney, J. (1971) Economic aspects. Amer. J. Clin. Nutr. 24: 970-975.

McNaughton, J. and P. L. H. Davey (1975) Nutrition education in developing countries. In: Priorities in Child Nutrition in the Developing Countries, J. Mayer (ed.). United Nations Economic and Social Council E/ICEF/L.1328, Volume 3, p. 310-313.

Monckeberg, F. (1970) Factors conditioning malnutrition in Latin America. Bibl. Nutr. Diet. No. 14, p. 23.

Morley, D. (1973) Paediatric Priorities in the Developing World. London: Butterworths.

Morley, D. (1975) Education in nutrition. In: Priorities in Child Nutrition in the Developing Countries, J. Mayer (ed.). United Nations Economic and Social Council E/ICEF/L.1328, Volume 3, p. 231-233.

Morley, D., J. Biddulph and D. B. Jelliffe (1974) Harmful advertising of infant foods. Editorial in J. Trop. Ped. 20: 183.

Muller, M. (1974) The Baby Killer. London: War on Want, 467 Caledonian Road, London N7 9BE.

Muller, M. (1976a) Copyrighted information submitted to Arbeitsgruppe Dritte Welt, Bern, Switzerland, partially reprinted in their book Exportinteressen Gegen Muttermilch. Reinbek Bei, Hamburg (Germany): Rowohlt, 1976.

Muller, M. (1976b) The infant food industry (letter) Lancet 2: 1018.

Nestle (1970) Nigeria. Bulletin Nestle, No. 3, p. 13.

Nestle (1971) Thailand '71. Bulletin Nestle, No. 3.

Newton, M. and N. R. Newton (1962) Mothers' reactions to their newborn babies. JAMA 181: 206.

Newton, N. and M. Newton (1967) Psychological aspects of lactation. New England J. Med. 277: 1179-1188.

Nõ Pintcha, 15 April, 1976.

Olds, S. W. (1976) Breast-feeding is nature's way of saying mother knows best. Today's Health 54(3): 47.

PAG (1972) PAG recommendations for the promotion of processed protein foods for vulnerable groups. PAG Statement No. 23. PAG Bulletin 2(3): 10.

PAG (1973) Promotion of special foods (infant formula and processed protein foods) for vulnerable groups. PAG Statement 23, Revised 28 November, 1973.

PAHO (1970) Guidelines to young child feeding in the contemporary Caribbean. Pan American Health Organization Scientific Publication No. 217.

PAN (1974) Newspaper of the World Food Conference. 14.11.74.

Packard, V. (1957) The Hidden Persuaders. New York: David McKay Co., Inc.

Parlato, R. (1974) Advertising and mass communication: a model for rural nutrition information programs. PAG Bulletin 4(1): 17.

Patterson, B. (1973) Promotion and management of breast feeding. In: New Horizons in Midwifery. Maryland: Waverly Press. Cited by Jelliffe et al., 1975.

Pechevis, M. (1975) Elements for a policy promoting breast feeding. Carnets de l'enfance, Assignment Children (UNICEF), No. 32, Oct.-Dec. 1975.

Pierce, F. N. (1971) How foreign students see advertising. J. Advertising Research 11(6): 26.

Plank, S. J. and M. L. Milanesi (1973) Infant feeding and infant mortality in rural Chile. WHO Bulletin 48: 203-210.

Post, J. E. (1976) Marketing and nutrition policy in LDC's: the case of infant formula. Boston University School of Management Research Program in Management and Public Policy, working paper (mimeo.).

Pye, L. W. (1963) (ed.) Communication and Political Development. Princeton, N. J.: Princeton University Press.

Rachman, S. (1970) The modification of attitudes and behavior. In: P. Gyorgy and O. L. Kline (eds.), Malnutrition Is a Problem of Ecology. Basel: S. Karger, pp. 132-141.

Raimbault, A. M. (1974) Evolution of breast feeding, the present situation. Children in the Tropics, No. 96.

Reutlinger, S. and M. Selowsky (1976) Malnutrition and poverty. World Bank Staff Occasional Paper No. 23, Johns Hopkins Univ. Press, Baltimore.

Rogers, E. M. (1962) Diffusion of Innovation. New York: The Free Press.

Rogers, E. M. (1969) Modernization Among Peasants. New York: Holt, Rinehart and Winston, Inc.

Rogers, E. M. and F. F. Shoemaker (1971) Communication of Innovations. New York: The Free Press.

Rohde, J. E. (1974) Human milk in the second year. Paediatrica Indonesiana 14: 198-207.

Rosa, F. N. (1975) Breast-feeding in family planning. PAG Bulletin 5(3): 5.

St. Vincent Statistical Unit (1975) Digest of Statistics for the Year 1974. (No. 24), St. Vincent, West Indies.

Samba (1974) Statement to 27th World Health Assembly, Committee A, Eighth Meeting.

Saunders, D. J. (1974) Visual Communication Handbook. London: Butterworth Press.

Scheuing, E. E. (1974) New Product Management. Hinsdale, Illinois: Dryden Press.

Schramm, W. (1964) Mass Media and National Development. Stanford: Stanford University Press.

Schumacher, E. F. (1973) Small is Beautiful: Economics as if People Mattered. New York: Harper and Row. Cited in Marchione, 1976.

Seoane, N. and M. C. Latham (1971) Nutritional anthropometry in the identification of malnutrition in childhood. J. Trop. Pediat. 17(3): 98-104.

Sloper, K. et al. (1975) Factors influencing breast feeding. Arch. of Disease in Childhood 50: 165-170.

Smith, L. L. and M. Doughty (1974) Agricultural Statistics of the Caribbean Countries. United Nations Economic Commission for Latin America, Office for the Caribbean. ECLA/POS, 74/11, 12 August 1974.

Social Policy Research Ltd. (1973) Infant Feeding and Health in Ibadan. (Excerpted in Orwell, S. and Murray, J. (1974) J. Trop. Pediat. 20: 206).

Solon, F. (1972) Organizing the community for nutrition programs. Paper presented at nutrition education conference on Nutrition Education of the Public. International Union of Nutritional Sciences, Guadalajara, Mexico, 31 August - 1 September, 1972.

Spence, J. C. (1938) The modern decline of breast feeding. British Med. J. 2: 729.

Spicer, E. H. (1952) Human Problems in Technological Change. New York: Russell Sage Foundation.

Srabstein, J. C. (1976) Present trends in breast feeding. Paper presented to the Symposium on Human Lactation at George Washington University Medical Center, Washington, D. C., October 7-8, 1976.

Tannon, C. P. and E. M. Rogers (1975) Diffusion research methodology: focus on health care organizations. In: G. Gordon and G. L. Fisher (eds.), The Diffusion of Medical Technology. Cambridge: Ballinger Publishing Co.

Usborne, V. (1963) The home treatment of infant malnutrition in a rural district of St. Vincent. West Indian Med. J. 12: 253-255.

WHO (1974) Report of the 27th World Health Assembly. Agenda Item 2.2.3. May 18, 1974. (Reprinted in Jelliffe et al., 1975).

Weiss, W. (1970) Effects of the mass media of communication. In: G. Lindsay and E. Aronson (eds.), The Handbook of Social Psychology, 2nd ed. Reading, Mass.: Addison-Wesley, pp. 77-195.

White, A. (1974) The breast feeding campaign in Trinidad and Tobago. Cajanus 7: 205-214.

Wickström, B. (1971) Marketing of protein-rich foods in developing countries. PAG Guideline No. 10.

Willatt, N. (1970) How Nestle adapts products to its markets. Business Abroad, June, 1970, p. 33.

Williams, C. D. (1950) Teaching health in the tropics. Health Education Journal 8: 172-175.

Wray, J. D. (1976) Breast-feeding and the urban poor of the Third World. Paper presented at Symposium on Biosocial Aspects of Breast Feeding, Boston, February 21, 1976.